Kulera Landscape REDD+ Project for Co-Managed Protected Areas, Malawi

Project Design Document

To the Climate, Community & Biodiversity Standard (2nd Edition)

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Submitted by:

Terra Global Capital (TGC)

Project Proponents:
The Department of National Parks and Wildlife (DNPW)
Nyika Vwaza Association (NVA)
Nkhotakota Wildlife Reserve Association (NAWIRA)
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Implementing Partner
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Executive Summary

The Department of National Parks and Wildlife (DNPW), on behalf of the Government of the Republic of Malawi, the Nyika-Vwaza Association (NVA) and the Nkhotakota Wildlife Reserve Association (NAWIRA), along with Terra Global Capital and Total LandCare have created Malawi's first Reduced Emissions from Deforestation and Degradation (REDD) Project (the "Project"). The Project targets more than 45,000 households in more than 800 villages bordering three key protected areas in the Northern and Central Regions of Malawi: Nyika National Park, Vwaza Marsh Wildlife Reserve, and Nkhotakota Wildlife Reserve. The Project will be the first in Malawi to use a mosaic REDD methodology, approved under the Verified Carbon Standard (VCS) and combined with the Climate Community and Biodiversity (CCB) Standard, and is expected to prevent approximately tons of CO_2 over the 30-year life of the Project *(Figures forthcoming in VCS PD)*. This Project demonstrates how a developing country with one of the lowest human development values in the world can generate income from carbon markets, positively impact climate change, and benefit impoverished communities and biodiversity.

Why were these areas chosen?

Nyika National Park, Vwaza Marsh Wildlife Reserve, and Nkhotakota Wildlife Reserve are ideal sites for the creation of Malawi's first REDD+ Project. Encroachment due to natural population growth and migration has increased pressure on forests within these protected areas. Illegal logging, fires, and poaching have also negatively impacted forests and wildlife within these reserves. The DNPW and Community Associations have been working with communities living within 10 km of the borders of the protected areas in order increase community involvement in natural resource management. The Project Areas include diverse ecological landscapes which sustain a variety of rare and/or endemic species as well as support livelihood activities of the communities living nearby.

What are the expected benefits?

This Project supports sustainable forest management within the border zones of Nyika National Park, Vwaza Marsh Wildlife Reserve, and Nkhotakota Wildlife Reserve by supporting rural communities to develop a range of livelihood activities such as agricultural intensification and crop diversification, conservation agriculture, ecotourism, apiculture, coffee and macadamia production, and small-scale livestock rearing. The Project will also strengthen the linkages between the communities and the DNPW by enhancing understanding and enforcement of existing natural resource management agreements and facilitating the creation of co-management agreements and community natural resource management committees in areas where they are not already in place. The Project builds upon the benefits that communities within the border zone already receive from the livelihood programs implemented through the USAID-funded Kulera Biodiversity Project by adding an additional revenue stream from the sale of emission reductions, which will directly benefit local livelihoods and strengthen the capacity of communities to sustainably manage these natural resources. It also seeks to maintain and increase carbon stocks in these areas, while conserving globally threatened and endemic species.

What is the commitment of the Republic of the Government of Malawi?

The Government of Malawi has prioritized forest conservation and afforestation as part of a broader strategy of development, climate change adaptation, and mitigation (Ministry of Lands and Natural Resources. 2008) The DNPW has spearheaded efforts to involve communities in natural resource management and to expand the range of benefits communities receive from Malawi's national parks and wildlife reserves. The combination of national priorities and Department-level support has paved the way for the success of this Project, the first of its kind in Malawi. Given the breadth of the Project, it is expected to help inform the development of Malawi's national REDD+ strategy and support income generation from other forms of land-use carbon offsets.

What do avoided deforestation projects consist of?

The initiative is based on the REDD+ framework which received international support at the thirteenth Conference of the Parties to the United Nations Framework Convention on Climate Change COP 13 in Bali, Indonesia in December, 2007. Under REDD+, developed countries are willing to provide payments to compensate developing nations for forests that are sustainably managed. REDD+ is a unique

approach to climate mitigation which gives greater recognition to the importance of protecting and sustainably managing tropical forest resources in developing countries. It is estimated that around 20% of global CO_2 emissions originate from the loss of forests associated with land use and land cover changes (Solomon et al. 2007). Currently, these payments are only available through voluntary emissions reduction markets. After 2012, a post-Kyoto agreement may see the inclusion of a REDD+ mechanism in the official CDM (Clean Development Mechanism) market as well.

What is the project strategy that is followed?

Mobilizing communities to conserve the forest areas in the protected-area border zones is a key component of this Project. Activities supported under the Project include:

- Strengthening land-tenure and protected area governance;
- Support for the development and implementation of sustainable forest and land use management plans;
- Forest protection through patrolling, social fencing and maintenance of forest boundaries;
- Fire prevention and suppression activities;
- Reducing fuelwood consumption and increasing energy efficiency by introducing fuel-efficient woodstoves;
- Creating alternative sources of fuelwood through agroforestry and farm woodlots; management; and
- Sustainable intensification of agriculture on existing agricultural land.

Developing local enterprises based on sustainably harvested NTFPs such as honey, coffee, macadamia, and livestock. How will degraded forests be restored?

The REDD+ Project relies on co-management agreements between the NVA and NAWIRA representing communities in the protected area border zones and the DNPW. These co-management agreements provide for a transfer of specified rights of use and obligations for management of land, water and natural resources within the protected areas. Increases in carbon stocks in regenerating forests would provide additional income from the sale of emission reductions into a Public Private Partnership Entity, currently being established as a "company limited by guarantee" in Malawi on behalf of the DNPW and Community Associations, which will support livelihood improvement and conservation activities.

Project Location

Country:	Malawi
Protected Areas:	Nyika National Park, Vwaza Wildlife Reserve, and Nkhotakota Wildlife Reserve

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1   GENERAL SECTION

1.1   Original Conditions in the Project Areas

1.1.1   General Information

1.1.1.1   Location of the Project and Basic Physical Parameters

The Project Areas include 5 km zone located just inside the border of three different protected areas in the Northern and Central Regions in Malawi: Nyika National Park, Vwaza Marsh Wildlife Reserve, and Nkhotakota Wildlife Reserve (see Figure 1)).

The Project Zones are comprised of both the Project Areas and a 10 km zone just outside the boundaries of the three protected areas. Communities living within 10 km of the Nyika and Vwaza areas have formed Natural Resource Committees which are cooperating with Malawi's DNPW to collaboratively manage these areas.

Specifically, elected representatives have created Community Associations, Nyika-Vwaza Association (NVA) and Nkhotakota Wildlife Reserve Association (NAWIRA), which have signed collaborative management ("co-management") agreements with the DNPW. The co-management agreement obligates the associations to ensure compliance with the National Parks and Wildlife Act (2004), other laws and the protected area management plans, on the part of the association members, employees and general public. In exchange, the community members receive assistance from the government to generate wildlife-based income. The NAWIRA association, established in Nkhotakota is currently organizing a similar co-management agreement with the DNPW. The Project Areas include the resource use zones within the park and Project Zones include the communities living 10 km outside of the park boundaries. **Error! Reference source not found.** illustrates the spatial distribution of the Project Areas and the Project Zones.
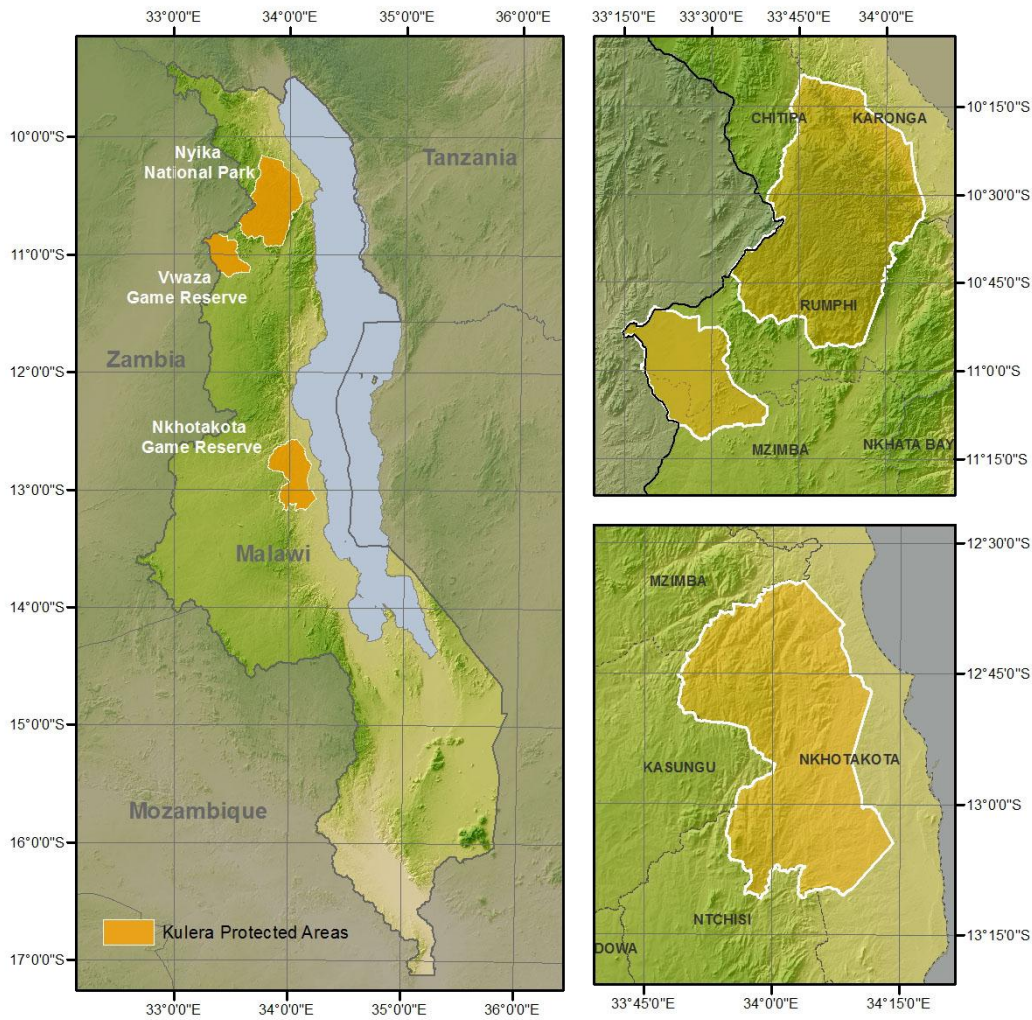
Figure 1. Regional Location of the Project Areas in Malawi

Malawi is a landlocked country, of high mountains and deep lakes. One fifth of it is covered by Lake Malawi, which fills the trough of the Great African Rift Valley that traverses the country from north to south. East and west of the lake, the land forms high plateaus that reach as high as 2,600 meters in the Nyika uplands, and 3,048 meters at Mount Mulanje. Malawi shares borders with Mozambique to the east and south, with Zambia to the west, and with Tanzania to the northeast. There are four major urban centers: Blantyre, Lilongwe, Zomba, and Mzuzu. Out of a total land area of 9,448,741 ha, 48% is considered arable.

Most of the Project Areas are in the basin of Lake Malawi. Freshwater systems within the basin that are of relevance to the Project Areas include Lake Kazuni (adjacent to the Vwaza Wildlife Reserve), the Bua river (in the central region, in the vicinity of the Nkhotakota Game Reserve), and the Rukuru river (which flows from the Nyika plateau in the northern region).

Nyika National Park

Nyika National Park (NP) occupies a tract of mountain plateau and associated hills and escarpments in northern Malawi in an area covering 3,200km^2 bordering Chitipa, Karonga, and Rumphi Districts whilst the western boundary borders Zambia. It is the largest national park in Malawi and is centered upon 10°33'S, 33°50'E.

The Nyika National Park is located on a high dissected plateau that consists of rolling plains with rocky outcrops, with an elevation ranging from 600-2600 m above sea level, and is in an area of relatively high rainfall. *Nyika* means "where the water comes from" and it is among the protected areas established to protect water sources. As its name suggests, it is a headwater area in a region of high rainfall, and is the source of tributary streams that feed the South Rukuru River.

Established as a reserve in 1948, the park boundary was extended in 1978 to protect an important catchment area that supplies the northern region with water for domestic consumption, irrigation and hydro-power generation and to maintain habitat for large mammal migration between the plateau and surrounding woodlands (Department of National Parks and Wildlife 2004b). Land outside the park is mostly used for agriculture by smallholder farmers on customary land and medium to large-scale commercial farmers on leasehold estates. Farmers report continued depredations of their crops by wildlife from the park, particularly monkeys, baboons, wild pigs, elephant, and buffalo (Department of National Parks and Wildlife 2004b).

Figure 2. Landsat 8 imagery from 2013 draped over SRTM elevation data.

Nyika contains six distinct physiographic zones: the eastern escarpment (Phoka-Nchenachena Kulera Biodiversity Project Priority Area); northern and southern hills; the western escarpment; the plateau; and the Mpanda-Kawozya ridge (a plateau remnant in the northern hill zone). The eastern escarpment is part of the western wall of the Great African Rift Valley, and the plateau is the remnant of an uplifted block created by the tectonic activity that formed the rift (Department of National Parks and Wildlife 2004b).

Most streams and rivers are perennial and stream flow characteristics are ascribed to high overall rainfall with some rain throughout the year, low evaporation (cloudiness and low ambient temperature), good vegetation cover to promote infiltration, and deep, freely draining soils. However, a recent survey of river conditions revealed that rapid bank erosion is occurring in some places. River channels are becoming wider and shallower and silt is being deposited over gravel beds (Environmental Affairs Department 2006). A recent survey of river conditions revealed that rapid bank erosion is occurring in some places. River channels are becoming wider and shallower and silt is being deposited over gravel beds (Environmental Affairs Department 2006). Soils are of two types: either deep, well drained, red and fine textured with high levels of acidity, or moderately deep to shallow, well drained, medium to fine textured and stony (Mawaya et al. 2011).

Vwaza Wildlife Reserve
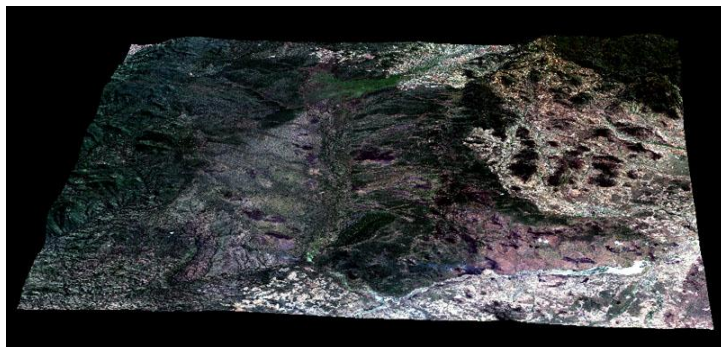
Figure 3. Landsat 8 imagery from 2013 draped over SRTM elevation data.

Vwaza Wildlife Reserve occupies a tract of diverse terrain in northern Malawi covering 978 km2 and it is centered upon 11° 00'S, 33° 28' E. The reserve comprises a region of hills and pediments in the east, and a region of wetland and alluvium in the west. The reserve lies partly in Rumphi and partly in Mzimba District whilst its western and part of its northern boundary coincides with the Malawi – Zambia border.

The Vwaza Wildlife Reserve, at an elevation of 1100-1400 m above sea

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level, consists of flat plains with dotted hills and marshy wetlands, fed by streams arising on the Nyika plateau. The South Rukuru River on the southern boundary drains into Lake Kazuni, which is located at the south-eastern tip before it turns east. Vwaza Marsh was declared a protected area in 1941 and expanded to its current size in 1984 (Department of National Parks and Wildlife 2004b).

The reserve is predominantly flat with an average altitude of approximately 1,125 m. The lowest point is at Lake Kazuni (1,082 m) in the southeast and the highest point is 1,660 m at Mahobe Hill in the northeast. There are close associations between landform and soils. The hills in the east are characterized by shallow rocky soils on hill slopes, and slightly deeper soils in valley bottoms.

Soil texture is generally sandy loam with moderate infiltration. The gently sloping pediments at the base of hilly areas comprise sandy and sandy loam soils with high infiltration rates and moderate fertility. Soils on lower pediment slopes have a higher clay content are more fertile and have lower infiltration rates. The plateau areas in the west of the reserve have deeply weathered sandy loam soils with high infiltration rates and low fertility. Alluvial soils of the plains, which comprise most of the center of the reserve have sandy clay-to-clay soils that are seasonally waterlogged. These soils have low infiltration rates and are moderately fertile. Soils in the marsh are waterlogged for most of the year and comprise dark, fine textured mud. Gully erosion is a problem on some of the deeper, finer texture soils.

Surrounding communities grow maize, tobacco, beans, groundnuts and a variety of vegetable in the wetland gardens. Farmers report continual depredations of their crops by wildlife from the reserve, particularly hippo near Lake Kazuni, but also monkeys, baboons, wild pigs, elephant, and buffalo (Department of National Parks and Wildlife 2004b).

All streams and rivers in the reserve flow into the perennial South Rukuru River on the southern boundary whilst Vwaza Marsh is supplied by the Hewe River that rises in the southeastern hills of the Nyika plateau. Soils are very deep, brown, and medium textured, with variable drainage (well drained to poor).

Nkhotakota Wildlife Reserve

Nkhotakota Wildlife Reserve is the oldest and largest wildlife reserve covering 1082 km² and is centered upon 12°55′00″ S, 34°18′00″ E. It is located in the Central Region of Malawi. Most of the reserve is comprised of *miombo* woodlands with large patches of grasses along wetlands.

The Nkhotakota Wildlife Reserve, found at an elevation ranging from 500-1,700 m above sea level, consists of rolling to steeply dissected and undulating topography, which is mountainous in the west, where Chipata hill rises to a height of about 1,700 m. The wildlife reserve is an important catchment area for Lake Malawi because three major rivers (Bua, Dwangwa and Kaombe) pass through it.

Figure 4. Landsat 8 imagery from 2013 draped over SRTM elevation data.

Soils are moderately deep to deep, well drained, coarse to medium textured and occasionally stony with often a skeletal subsoil (Mawaya et al. 2011).

1.1.1.1.1 Climate in the Project Region

The area's climate is subtropical, with 95% of rainfall occurring in the warm wet season which stretches from November to April (see Figure 5). The average annual rainfall across Malawi ranges from a minimum of 725 mm to a maximum of 2,500 mm. In the central/northern region in the vicinity of the lake, annual rainfall ranges from approximately 1,000 to 1,800 mm per year. The mean total rainfall ranges from 10 mm in September to 224 mm in March in the central/northern region, , though slightly lower in

the Nyika plateau area. Precipitation varies between the three protected areas. The Vwaza Wildlife Reserve is one of the driest areas of Malawi while the Nyika National Park and Nkhotakota Wildlife Reserves receive significantly higher rainfall.

Nationwide, mean temperatures vary between 17 and 27 °C and between 25 and 37 °C during the hot dry season, in September and October. Maximum temperatures range from 22 to 30 °C, minimum temperatures from 12 to 20 °C. (see Table 1).

However, the mean minimum temperature in Nyika can be much lower (i.e. mean temperature in July is 2.5-5.0°C, due to its high elevation). See Table 2 for a breakdown of climatological information by Project Area.
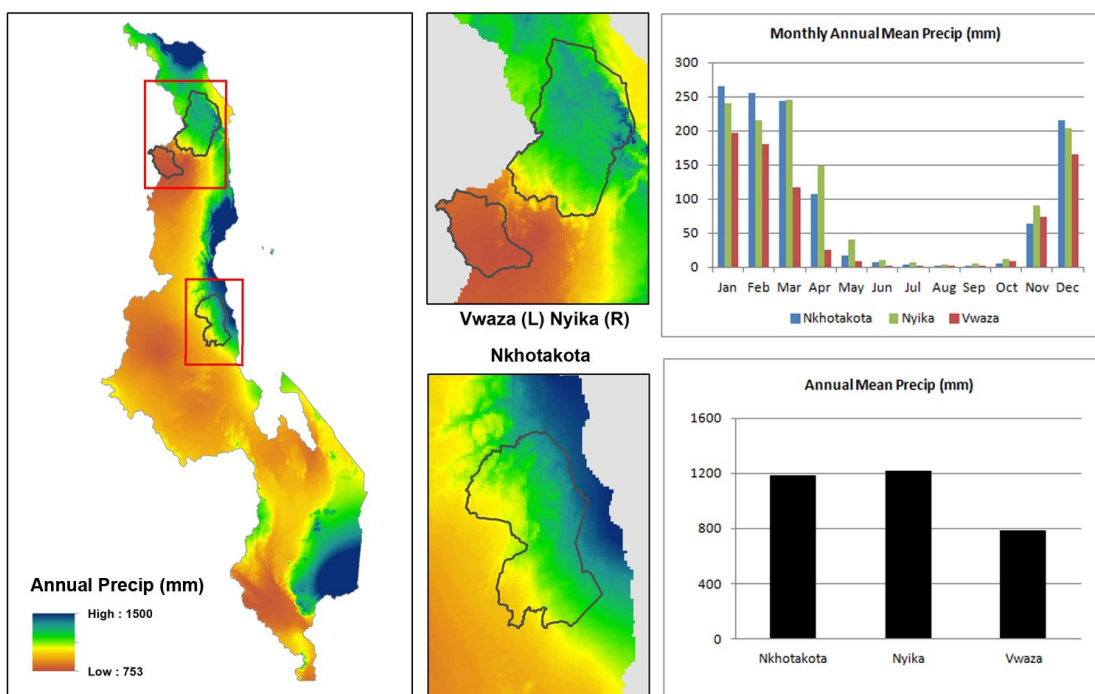
Figure 5. Annual precipitation based on interpolated climate station datasets from a period between 1950 and 2000. Source: WorldClim, Robert Hijmans (2005)

Table 1. Climatological information, Mzuzu (Central/Northern Malawi)

Month	Mean Temperature °C		Mean Total Rainfall (mm yr^{-1})	Mean Number of Rain Days
	Daily Minimum	Daily Maximum		
Jan	16.1	25.5	203.3	20.0
Feb	16.5	25.6	179.5	18.0
Mar	16.0	24.8	224.1	20.0
Apr	14.9	23.5	213.0	19.0
May	11.6	22.1	58.8	9.0
Jun	7.9	20.4	29.5	6.0
Jul	6.5	20.3	30.1	6.0
Aug	6.6	21.9	11.8	3.0

Month	Mean Temperature °C		Mean Total Rainfall (mm yr⁻¹)	Mean Number of Rain Days
	Daily Minimum	Daily Maximum		
Sep	8.7	25.1	10.4	2.0
Oct	11.7	27.2	35.4	3.0
Nov	14.2	27.2	95.7	9.0
Dec	15.9	26.1	197.0	18.0

Climatological information is based on WMO Climatological Normals (CLINO) for the 30-year period 1961-1990
Mean number of rain days = Mean number of days with at least 0.3 mm of rain.
Source: World Meteorological Organization, www.worldweather.org

Table 2. Climatological information by Project Area

	Nyika NP	Vwaza WR	Nkhotakota WR
Mean monthly temperature during growing period (°C)	12.5 -20.0 (mean minimum temperature in July is 2.5 - 5.0)	20.0 - 22.5	20.0 - 25.0
Mean annual rainfall (mm)	800 - 1650	800 - 1200	800 - 1600
Length of the growing period (days)	180 – 225	165 - 180	150 - 195

Source: Total LandCare 2009

1.1.1.2 Types and Condition of Vegetation within the Project Areas

Of nine major vegetation types found in the country, the most prevalent are miombo woodlands, deciduous forests and thickets, evergreen and semi-evergreen forests, and afromontane grassland (Environmental Affairs Department 2006).

Across Malawi, land classified as forests is found in:

- Plantations - 110,000 ha (2.5%)
- Forest reserves - 870,052 ha (22%)
- National parks and game reserves - 981,479 ha (25%)
- Customary land 1,988,255 ha (50.5%) - mostly disturbed, 20-70% cultivated (Kainja, 2000).

Miombo woodland are commonly restricted to protected areas and are a wooded savanna, similar to oak woodlands of California. Miombo woodland is a dry-deciduous ecosystem, where some trees will lose their leaves in the dry season. Grass can be seen through gaps in the woodland canopy, and fire can burn in the understory (Kulera VCS Methodology 2012).

Brachystegia spp and *Julbernardia globiflora* are dominant miombo woodland species and play an important role in water conservation by protecting steep slopes from erosion. Other miombo wooldland species include *Acacia spp., Bauhinia spp, Combretum spp., Sclerocarya birrea, Strychnos cuccloides, Parinari curatellifolia, Vangueria infausta, Azanza garckean and Schinziophyton rautanenii.* Over 20 genera were recorded including *Brachystegia, Julbernardia, Terminalia, Combretum, Acacia, Pterocarpus, Uapaca, Syzygium, Erica, Protea, Parinari, Pericopsis, Diospyros* and *Diplorrhynchus.* Miombo woodlands are under threat from deforestation for firewood, charcoal, honey collection, poaching, fire, and encroachment (Mawaya et al. 2011).

Vegetation in Nyika National Park

Vegetation consists of montane grasslands and evergreen forests with patches of relic montane evergreen forests. Predominantly, expansive rolling grasslands are interspersed with evergreen riverine

forests along waterways. The park's vegetation has been broadly classified into four types: *dambo* grasslands near rivers and at headwaters of drainage lines; montane grassland on the plateau; montane forest; and *Brachystegia* woodland around the plateau. On the escarpment and at lower elevations, the vegetation is mainly deciduous miombo woodland. *Brachystegia spp.* and *Julbernardia globiflora* are the dominant woodland species which play an important role in water conservation by protecting steep slopes from erosion. In addition, the park is famous for its orchid species, many of which are endemic. A variety of plants such as Cape gooseberry and sisal survive at all old settlement sites in addition to peaches, mangoes, bananas, coffee, oranges, cassia and cedar trees (Department of National Parks and Wildlife 2004b).

Vegetation in Vwaza Wildlife Reserve

The vegetation is a mosaic of open to dense woodland with wetland grasslands and marshes in the central low lands. Vegetation of the reserve has been broadly classified into *Brachystegia* woodlands communities on hills, pediments and plateau areas; *Combretum –Terminalia* woodland communities on pediments, alluvial pans and valley bottoms; *Colophospermum mopane* woodland on alluvial sites with clay soils; and *Acacia* woodland on river flood plains and grasslands communities on plains, dambos and in the marsh (Department of National Parks and Wildlife 2004b; McShane 1985).

Vegetation in Nkhotakota Wildlife Reserve

The vegetation is comprised of dense *Brachystegia* woodland and riverine forests, interspersed with occasional patches of tall *Hyparrhenia-Andropogon* grasses in the low-mid altitudes, and dense evergreen forest in the uppermost elevations. Soils are moderately deep to deep, well drained, coarse to medium textured and occasionally stony with often a skeletal subsoil.

1.1.1.3   Boundaries of the Project Areas and Project Zones

The Project Areas of the Project are found within a 5 km wide area inside of the participating protected areas in Malawi (Table 3). GIS shapefiles of the protected areas were provided by the DNPW and used for defining the locations of the Project Areas. The 5 km inside buffer distance was selected to address observed deforestation and degradation occurring on the edges of Malawi's protected areas. According to the DNPW there are four main reasons for this: (1) lack of protected area enforcement, (2) community uncertainty of formal park boundaries, and (3) depleted forest resources from areas surrounding the protected areas, and (4) livelihood needs of surrounding communities. The protected area edges are impacted due to the proximity of populated areas with diminishing impact towards the interior; the 5 km buffer distance represents an estimated mean maximum distance a villager will travel into the protected area for agriculture or wood product harvesting.
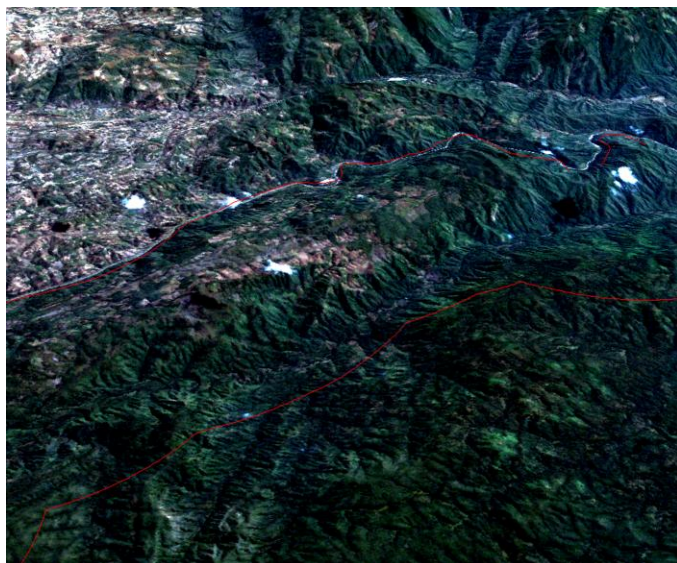
Figure 6. Five kilometer buffer area (between the red lines) in the northwest corner of Nkhotakota Wildlife Reserve. The ridgeline deforestation observable within this buffer zone demonstrates edge deforestation due to unenforced protected area boundaries. Image created using 2013 Landsat 8 imagery draped over a digital elevation

The Project Areas were set using the 5 km wide inside buffer of the protected area boundaries. Areas adjacent to the Zambia border were removed from both Nyika and Vwaza Project Areas along with areas adjacent to Forest Reserves (Mndilandsadzu FR and Dwambadzi FR) to the north and south of the Nkhotakota Project Areas. To complete the Project Areas from the resulting gaps, the parcel ends were set using watershed boundaries. Watersheds were generated using ESRI ArcHydro software based on an SRTM 90 m resolution elevation data, with the accumulation threshold set to 972 hectares (1200 pixels).

The Project is being developed as a Grouped Project under the assumption that additional Project Areas will be added in the future under Grouped Project guidelines. For example, communities have been engaged surrounding the Ntchisi Forest Reserve in anticipation of the future inclusion of Project Areas located within the Ntchisi Forest Reserve.

Table 3. Size and Location of the Project Areas at Project Start Date

ID	National Park (NP) Name	Size of Project Areas (ha)	Centroid Coordinate [decimal degrees] WGS-84	
			Lon (X)	Lat (Y)
NYKA	Nyika National Park	102,316	33.4482	-11.0134
VWZA	Vwaza Wildlife Reserve	38,482	33.8483	-10.5703
NKHT	Nkhotakota Wildlife Reserve	76,472	34.0353	-12.8740
	Total	217,270*		

Project Areas include a percentage of non-forest area. Only forested Project Areas will be used in carbon calculations.

Reference Region

A Reference Region was selected to assess historical and current deforestation and forest degradation quantities and trends for the Project Area baseline according to the process set out by VCS Methodology VM0006 v2.0. Variables considered in selecting the Reference Region location were: (1) forest laws and

policies, (2) land use history and dynamics (e.g. forest cover, agricultural systems), (3) ecological conditions (forest types present and climatic conditions), and (4) social conditions (e.g. population density, sources of income).

The methodology being used for the VCS, VM0006 v2.0, requires a Reference Region to be sized to at least the area of the Project Area(s) or 250,000 ha, whichever is greater. Since the Project Areas sum to less than 250,000 ha, a minimum Reference Area size of 250,000 ha is required.

Proximity to Protected Areas was a key determining factor for identifying a suitable Reference Region. In addition to the three Project Protected Areas, additional nearby Protected Areas were included in establishing the Reference Region boundaries. To match the Project conditions, areas up to 5 km within the Protected Area boundaries and 5 km outside of the Protected Area boundaries were established as potential areas to be included in the Reference Region. These additional areas include Musisi Forest Reserve ~10 km north of Nyika, Mndilandsadzu Forest Reserve adjacent to Nkhotakota, Dwambadzi Forest Reserve also adjacent to Nkhotakota, and Ntchisi Forest Reserve located ~10 km south of Nkhotakota. Since the area immediately adjacent to the Project Areas is used for the Leakage Belt, area outside of the Leakage Belt, up to 5 km, was also include as potential Reference Region area.

To establish the Reference Region boundary a number of boundary types approved by VM0006 were assessed. It was found that watersheds provided the greatest degree of flexibility in ensuring that suitable land use types are selected. The watersheds were generated using ESRI ArcHydro software based on an SRTM 90 m resolution elevation data, with the accumulation threshold set to 972 hectares (1200 pixels). Watersheds that fell on a 5 km buffer of the Leakage Areas and Project Areas were selected as the basis for the Reference Region. From the set of selected watersheds, unsuitable watersheds were removed. Unsuitable areas include large-scale agriculture, towns and coastal ecosystems. Remote sensing imagery from 10 – 15 years prior to the Project start date was used to assess suitable land cover.

The resulting potential Reference Region area was further clipped to fit within the footprint of the remote sensing imagery used for classification. Additionally the boundary of a pine plantation observed in remote sensing imagery located within the Reference Region, south of Nkhotakota was manually digitized and removed from the Reference Region. The final Reference Region, (Figure 23), has an area of 367,822 ha, exceeding the 250,000 ha requirement. The inclusive Reference Region, which includes the Reference Region, Project Areas and Leakage Belt, has a combined area of 880,877 ha.

1.1.2 Climate Information

1.1.2.1 Current Carbon Stocks within the Project Area(s)

Carbon stock information forthcoming in VCS PD Section 3.1.1.4

1.1.3 Community Information

1.1.3.1 Description of Communities Located in the Project Zones

Key challenges for conservation in Malawi are a rapidly growing and predominantly rural population that is poor and heavily dependent on natural resources to meet livelihood needs. The current population is 13 million, with an annual growth rate of 2.8%, of which 85% is rural. From 1998 to 2008, population increased by 32%, as density increased from 105 to 139 persons per km² (National Statistical Office 2008). The average life expectancy is 52.4 years. Poverty is high: 65% of the population is living below the national poverty line, with 90% of the population earning less than USD2 per day, and 74% earning less than USD1.25 per day (UNDP 2009).

The highest concentration of the population (45%) is found in the Southern region, while 42% lives in the Central region and 13% lives in the Northern region. However, the share of population in the Project Zones in the central and northern regions is rapidly increasing (National Statistical Office 2008).

The Project is targeting a total of more than 45,000 households in the Project Zones. This total number of households represents a total population of 225,000 people who are living in rural communities in the border zone of the targeted protected areas. A detailed socio-economic baseline survey was conducted in

the three Project Zones over 13 weeks from December 2010 to March 2011 (Phiri, Mapemba, and Sopo 2011).

Most households living around these PAs are characterized by dire poverty, undertaking practices that are destructive to the same resources upon which their livelihoods depend. The main occupation in the Project Zones is small-scale farming (92% of households) followed by small-scale or barter trade (48-50% of respondents). Average annual incomes in the Project Zones ranged from MK 66,798.00 (~ USD248) to MK 68,548.80, (~USD254 based on an exchange rate of 270 Malawi Kwac.to USD1). Food insecurity is chronic in many areas in Malawi. In the Project Areas, one-fifth to one-quarter of the survey respondents reported running short of food the previous year. The worst month for food shortages and insecurity occur between December and March, at the start of the planting season before food crops are mature enough to harvest. Almost without exception, fuelwood is the main source of energy for cooking and heating households.

In addition, most communities have limited access to support services such as health care, education, agricultural extension, inputs, markets and tele-communications because they reside in remote areas with poor roads and infrastructure. Survey respondents reported lacking access to training in basic skills needed to run small enterprises.

In the mid-1990s the DNPW started the co-management program in Nyika and Vwaza to involve communities in the co-management of protected areas. The co-management agreement provided specified rights of sustainable use of land, water and natural resources within Nyika National Park and Vwaza Marsh Wildlife Reserve to communities and created a benefits-sharing program to facilitate wildlife-based income generating activities for the association.

The National Parks and Wildlife Act provides for sharing of 50% of Park entry fees and 20% of concession fees with communities. The revenue sharing programme has been piloted in Nyika-Vwaza area and between 2004 and 2008 the NVA collected USD7000 annually. The funds were used to construct school blocks, teachers' houses, health centres and boreholes. These benefit sharing programmes have promoted community participation in construction of fences, clearing of boundaries and surrendering of muzzle loading guns in Nyika-Vwaza (Environmental Affairs Department 2010).

Communities around Nyika National Park.

Communities living within 10 km of Nyika National Park and Vwaza Marsh Wildlife Reserve formed village-level NRMCs. The NVA is an umbrella group comprised of members elected from the communities. The NVA acts on behalf of the village- and zone-level NRMCs in meetings with the DNPW to establish general rules for the co-management agreements and benefits-sharing arrangements. This is the first program of its kind in Malawi, and it is being replicated in national parks and reserves across the country. Project proponents are currently supporting the creation of a similar co-management program in the newly created NAWIRA and its Project Zone.

The population in the areas around Nyika National Park are predominantly ChiTumbuka-speaking agriculturalists, with some Ngoni who migrated to the area from the south in the mid-1800s, and a smaller number of more recent migrants from the Central and Southern regions of Malawi. A group of hunter-gatherers known as the Phoka were evicted from the park in the 1960s and 1970s and resettled or assimilated in adjacent communities or near Lake Malawi (McCracken 2012). Most people practice a mix of Christian and traditional religious beliefs. Historically, Christian mission influence in the North contributed to much higher rates of education. Today, the communities around Nyika are some of the most well-educated in Malawi, with nearly one-third of respondents completing secondary school (32.2%), and nearly half (46.8%) completing Standard 8 (Phiri, Mapemba, and Sopo 2011).

The communities around Nyika practice subsistence farming consisting mainly of maize, beans, cassava, and groundnuts. Cash crops are tobacco, cotton, soy, and, on a limited scale, coffee in the Nchenachena area on the eastern side of Nyika. There is also high potential for honey production and collection of

termites and wild mushrooms, which are abundant during the rainy season. Livestock includes cattle, goats and sheep but the tsetse fly found around the southwestern borders poses a risk of trypanosomiasis.[1]

Expansion of the park in the 1970s required the resettlement of about 5,000 people. The evictions were undertaken over a protracted period between 1978, largely by district government officials. Many of the evicted families lost their property during the resettlement exercise and were placed on inferior land, which has resulted in increased confrontation between the park and neighboring communities (Department of National Parks and Wildlife 2004a). Illegal use of park resources, including cultivation and setting fires for hunting, has increased since the evictions (Department of National Parks and Wildlife 2004a).

Communities around Vwaza Wildlife Reserve

Livelihoods and cultural history are similar to those described for Nyika above, due to the geographic proximity of the two areas. Between 1977 and 1984, approximately 2000 people were resettled outside of the park boundaries (Department of National Parks and Wildlife 2004b). Illegal extraction of resources from the park, opening gardens for cultivation, and setting fires for illegal hunting activities or retaliation have increased since the resettlement of these populations. However, communities participating in the Collaborative Management Program who are eligible to collect NTFPs from the reserve report improved relationships with the DNPW. Small portions of the park boundaries have been realigned in order to accommodate community requests for increased access to land and water resources (Department of National Parks and Wildlife 2004b).

Communities around Nkhotakota Wildlife Reserve

The population around the reserve practices subsistence farming of cassava, maize, groundnuts, beans, and rice. They also fish in the Bua River and in Lake Chikukutu and Lake Malawi. Cash crops grown here are rice, cotton and tobacco. In addition, communities harvest termites and wild mushrooms as well as produce honey. Livestock include cattle, goats, pigs, poultry, but numbers are low and there is a high risk of trypanosomiasis due to the tsetse fly. Currently the Project partners are supporting community organizers in the Nkhotakota area as they organize village-level and zone NRCs as well as form an umbrella organization in order to establish co-management and benefits-sharing arrangements with the DNPW.

1.1.3.2 Description of Current Land Use and Property Rights

Project Areas

The Project Areas are located just inside the border of three public protected areas: Nyika National Park, Vwaza Marsh Wildlife Reserve, and Nkhotakota Wildlife Reserve. The National Parks and Wildlife Act of 1992 provides the Minister with the authority to declare public land in Malawi as national parks or wildlife reserves, as well as change the boundaries of existing protected areas; and when each of the protected areas were gazetted they became the property of the Government of Malawi.

In addition, the Act provides for community co-management of national parks and the wildlife and forest resources, found within the National Parks Amendment Act No. 15, 2004. The NVA has signed a co-management agreement with the DNPW providing NVA certain rights and responsibilities for management of natural resources within the boundaries of the protected areas.

Additionally the Project Proponents have each signed an "Agreement for the Carbon Development, Carbon Rights and Benefits Sharing with Respect to Emission Reductions for the Kulera Biodiversity

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[1] Human African trypanosomiasis (sleeping sickness) is a parasitic disease of people and animals, caused by protozoa of the species Trypanosoma brucei and transmitted by the tsetse fly

Landscape REDD+ Project in Co-Managed National Protected Areas in Malawi" (September 2013). This agreement formalizes the roles and responsibilities of each of the Project Proponents to the develop the Project and support the development of emission reductions from the Project and affirms that each of the Project Proponents will transfer emission reductions from the Project to a Public Private Partnership Entity, eliminating any potential ambiguity around ownership of emission reductions.

Project Zones

The Project Zones include the Project Areas and the 10 km areas around the borders of the protected areas. The socio-economic baseline survey results indicate that land tenure is similar near the three Protected Areas and is customary land tenure. In fact, over 90% of land around the three protected areas is managed under customary land tenure practices. Other types of tenure systems such as borrowing (free use), tenancy, and renting /leasing were less important in all the study sites (Phiri, Mapemba, and Sopo 2011).

According to National Land Policy of 2001, the government may assign land as public land which any land that is held in trust and managed by the Government or Traditional Authorities and accessible to the public at large. Within the boundaries of Traditional Authorities public lands are lands that are not allocated exclusively to any group, individual or family; however, they are reserved for the exclusive use of members of the respective Traditional Authority. These include, for example, *dambos* or communal grazing and communal forest areas. The policy emphasizes that public lands held in trust for members of a particular community does not automatically transfer ownership of that land to the Headsperson, Chief or public official and therefore is not considered private.

On the contrary, private lands, also called "customary estates," are customary lands that are allocated exclusively to a clearly defined community, corporation, clan, family or individual. Once registered customary estates provide the proprietor private usufructuary rights in perpetuity and can be leased or used as security for a mortgage loan. However, because the interest of a customary estate is usufructuary only, the sale, lease or mortgage are subject to what are known as the overriding interests of the community and the sovereign rights of the state.

Administratively, Malawi is divided into 28 districts. Each district is subdivided into smaller administrative units, or Traditional Authorities (TAs), which are ruled by Chiefs. While not recognized as an administrative unit, per se, Extension Planning Areas (EPAs) map very closely to Traditional Authorities. Within Traditional Authorities there are even smaller units headed by a Group Village Headman (GVH), which oversees several villages. The village, headed by a traditional Village Headman (VH) is the smallest administrative unit in Malawi. The recent Customary Land Bill, 2012 established new customary land committees, chaired by the GVH, and provided these committees a number of new powers including the right to determine the portion of customary land that will be set aside as communal land and for what purpose (Malawi Law Society 2012).

1.1.4 Biodiversity Information

In 2011, as part of the Project, a baseline wildlife survey was conducted in the Project Areas. The surveys mostly relied on recent wildlife counts from the DNPW. In addition resources included old and recent documents on wildlife resources in the national parks, wildlife and forest reserves such as master plans; the Fourth National Report on Biodiversity Resources in Malawi 2010; the Malawi State of Environment Outlook Report 2010; the Status of Wildlife Management in Malawi 2010; and the National Biodiversity Strategy and Action Plan (NBSAP) 2006.

1.1.4.1 Description of Current Biodiversity and Threats to Biodiversity in the Project Zones.

In total, the Project Areas contain exceptional biodiversity.

Nyika National Park is home to:

- more 95 species of mammals, including zebra, warthog, roan antelope, common duiker, bushbuck, klipspringer, reedbuck, side-striped jackal, hyena and eland;
- an estimated 430 species of birds, the most important of which include the Bustard and Wattled Crane (largest breeding populations in Malawi are on the Nyika); Red winged francolin

(subspecies endemic to Nyika); Greater Double-collared Sunbird and Baglafecht Weaver (endemic to Nyika); and Red-tufted Malachite Sunbird and Mountain Marsh Whydah (found nowhere else in Malawi);

- 47 species of reptiles, three of which are endemic to Nyika: Goetzei Nyika Chameleon (*Chameleo goetzei nyikae*), Nyika skink (*Mabuya varia nyikae*), and Hilda's Skink (*Mabuya hildae*);
- 34 species of amphibians, three of which are endemic to Nyika: Nyika Dwarf Toad (*Bufo taitanus nyikae*), Nyika Squeaker (*Arthroleptis xenodactyloides nyikae*); and black striped sedge frog (*Hyperlorius quinquevittatus merdensi);*
- roughly 27 species of fish (that have been recorded); and
- 287 species of insects (that have been recorded), 120 of which are butterflies. Five species of butterflies are thought to be endemic to Nyika (Mawaya 2011).

Vwaza also supports diverse fauna including:

- 50 mammal species, including elephant, hippo, buffalo, zebra, roan antelope, hartebeest, reedbuck, warthog, bush pig, impala, grysbok, duiker, bushbuck and kudu;
- 341 species of birds, including waterfowl, wading birds, crowned cranes and many raptors such as marsh Harriers;
- 10 species of fish (collect in the South Rukuru);
- Most reptiles and amphibians seem not to have been documented in the wildlife reserve.

Finally Nkhotakota Wildlife Reserve hosts tremendous biodiversity due to its diverse habitats, including:

- Low densities of large mammals, including elephant, buffalo, kudu, reedbuck, roan antelope, sable antelope, waterbuck, bushbuck, warthog, zebra, lions and leopard. The small patch of evergreen forest on Chipata Mountain is an important habitat for the Blue Monkey (*Cercopithecus mitis*), one of the rare animals in Malawi;
- A total of 280 bird species including the Taita falcon and Black stork, both of global conservation concern;
- 24 species of fish, including Opsoridium microlepis or Lake Salmon (mpasa) that is listed as endangered.

1.1.4.1.1 Threats to Biodiversity

While Malawi's national parks and reserves protect the habitats of a number of plant and animal species, threats to the habitat in these areas have been well documented (see Section 1.2.1)

Loss of habitat, which is occurring with increasing speed, has been recognized as a major threat to biodiversity in the Project Areas. In addition, hunting by community members with homemade firearms and wire snare traps for large mammals represents a significant threat to animal species within the protected area. There is a higher incidence of illegal hunting and unsustainable land-use practices in the Nyika-Vwaza area than in the Nkhotakota area.

A baseline biodiversity studies indicated specific areas where poaching was occurring in the Project Areas. Specifically, in Nyika National Park poaching occurred in all of the areas sampled; in Vwaza Marsh Wildlife Reserve there was some evidence of poaching; and in Nkhotakota Wildlife Reserve illegal fishing was observed in the Bua River.

Figure 7 shows mortality of key wild animal species in Nyika National Park, in terms of the percent of overall carcasses represented by a species (i.e. Elands account for roughly 15% of carcasses, and so on). These results show that some species with high population densities suffer high poaching incidences e.g. eland, reedbuck, but some despite having low relative densities still suffer high poaching rates because of preferences by the poachers e.g. common duiker, bushbuck.

Finally, illegal fishing of the endangered Lake Salmon (*Opsaridium microlepis and O. microcephum*) was recorded during the initial biodiversity baseline study (Mawaya 2011).
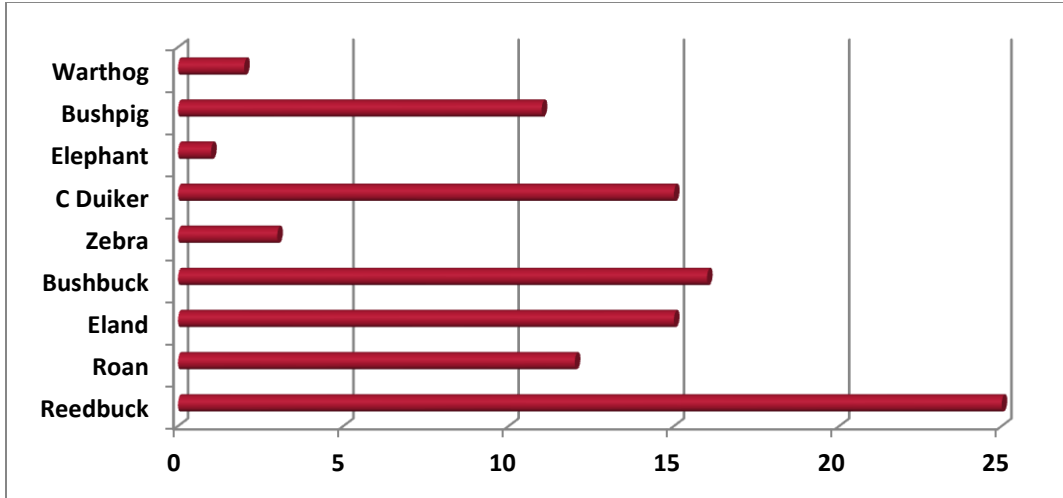
Figure 7. Mortality of Key Animal Species in Nyika National Park mostly from Poaching (Source: Mawaya 2011).

1.1.4.2 An Evaluation of Whether the Project Zones include High Conservation Value (HCV) areas and Description of Qualifying Attributes

High Conservation Values (HCVs) are biological, ecological, social or cultural values which are considered outstandingly significant or critically important, at the national, regional or global level. The six High Conservation Values cover a broad array of conservation priorities shared by a wide range of stakeholder groups, and include:

1. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.

2. Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

3. Rare, threatened, or endangered ecosystems, habitats or refugia.

4. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

5. Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

6. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples

1.1.4.2.1 Globally, Regionally or Nationally Significant Concentrations of Biodiversity Values

1.1.4.2.1.1 Protected areas

Nyika National Park, Vwaza Wildlife Reserve, and Nkhotakota are protected areas that support a wide diversity of plant and animal species, many of which are considered threatened, rare, or endemic. The Biophysical Inventory conducted in 2011 recorded low numbers of animal sightings. The following numbers of wildlife mammal species were observed in each protected area: Nyika National Park (10); Vwaza Wildlife Reserve (15); and Nkhotakota (14). The baseline results could be an indicator of habitat degradation within the 0-5 km zone and high poaching pressures within this zone such that animals could be going further into the protected area (Mawaya et al. 2011).

Biodiversity Value in Nyika National Park

Nyika National Park is a biodiversity hotspot, with diverse habitats providing home for 95 species of mammal, 426 species of bird, and 1225 plant species. It is also one of the last areas in Malawi with montane evergreen forests and an important breeding ground for bird species. Sites of cultural and historical significance include rain shrines and early metal working sites (Department of National Parks and Wildlife 2004a; McCracken 2012). The park was added to the list of tentative UNESCO World Heritage Sites in 2000.

Biodiversity Value in Vwaza Marsh Wildlife Reserve

Vwaza Marsh Wildlife Reserve's combination of flood plains, wetlands, *mopane* woodlands, and *Brachystegia* woodlands allow the reserve to support an abundant and varied mammal population. The diverse vegetation habitats in Vwaza Wildlife Reserve support a diverse vertebrate fauna that includes 50 mammal species, 341 species of birds, and 10 species of fish collected in the South Rukuru (Department of National Parks and Wildlife 2004b). Nearly one-third of the park is covered by an extensive wetland. The reserve was added to the tentative list for UNESCO World Heritage Sites in 2011 (UNESCO 2011).

Biodiversity Value in Nkhotakota Wildlife Reserve

Nkhotakota is the oldest and largest wildlife reserve in Malawi and has been identified as an area of global biodiversity significance (Maumbeta et al. 2010). The diversity of habitats includes wetlands, river marshes, montane evergreen forests, and miombo woodland. There are 280 species of bird, 24 species of fish, and numerous mammal species recorded within the reserve.

1.1.4.2.1.2 Threatened and Endangered Species

According to the IUCN Red List of Species for 2012, there are 18 animal animal species and 4plant species in Malawi that are listed as Critically Endangered, Endangered and Vulnerable:

- Critically endangered animal species include: Black Rhinoceros (*Diceros bicornis*),
- Endangered animal species include: Basra Reed-warbler (*Acrocephalus griseldis*), Thyolo Alethe (*Alethe choloensis*), Yellow-throated Apalis (*Apalis flavigularis*), Madagascar Pond-heron (*Ardeola idea*), Grey Crowned-crane (*Balearica regulorum*), White-backed Vulture (*Gyps africanus*), African Wild Dog (*Lycaon pictus*), Hooded Vulture (*Necrosyrtes monachus*), and Spotted Ground-thrush (Zoothera guttata).
- Vulnerable animal species include: African Elephant (*Loxodonta Africana*), White-winged Apalis (*Apalis chariessa*), Southern Ground-Hornbill (*Bucorvus leadbeateri*), Wattled Crane (*Bugeranus carunculatus*), Blue Swallow (*Hirundo atrocaerulea*), African Lion (*Panthera leo*), Secretary Bird (*Sagittarius serpentarius*), Lappet-faced Vulture (*Torgos tracheliotos*), and White-headed Vulture (*Trigonoceps occipitalis*)(IUCN 2012).

Endangered and Vulnerable Species in Nyika National Park

Among the species considered vulnerable that are found in Nyika include: the Blue Swallow (*Hirundo atrocaerulea*), Wattled Crane *Bugeranus carunculatus*). Two other species—the Pallid Harrier and Lesser Kestrel—are considered threatened within Malawi (Nyika-Vwaza Trust 2011). African Elephant (*Loxodonta Africana*) mostly inhabit valleys and hills and are occasionally seen on the plateau (Malawi Government, 2004)

Endangered and Vulnerable Species in Vwaza Marsh Wildlife Reserve

Several engendered or vulnerable animal species are found in Vwaza, including: African Elephant (*Loxodonta Africana*), African Wild Dog (*Lycaon pictus*), and Wattled Crane (*Bugeranus carunculatus*). Several species are uncommon elsewhere in Malawi, including Swainson's Spurfowl (*Francolinus swainsonii*)Souza's Shrike (*Lanius souzae*), Pale billed Hornbill (*Tockus pallidirostris*), and Racket-tailed Roller (*Coracias spatulatus*), and White-winged Babbling Starling (*Neocichla gutturalis*). The reserve's population of the White-winged Babbling Starling is considered to be the only protected population in Malawi (Department of National Parks and Wildlife 2004b).

Endangered and Vulnerable Species in Nkhotakota Wildlife Reserve

Among the vulnerable animal species found in Nkhotakota include African Elephant (*Loxodonta Africana*), African Lion (*Panthera leo*), In addition, while the species is not considered threatened, the Malawian waterbuck represents a subspecies of Waterbuck (*Kobus ellipsiprymnus*) that has yet to be described (Mawaya 2011). The Reserve also used to contain Black Rhino but they have not been spotted since 1972 (Mawaya 2011).

The evergreen forest on Chipata Mountain within the reserve is an important habitat for the Blue Monkey, *Cercopithecus mitis*, which were listed as a rare and endangered species by the Government of Malawi in 1981. In addition, the Taita falcon (*Falco fasciinucha*), considered to be Near Threatened (IUCN 2012) can be found in Nkhotakota. . Lake salmon (*Opsoridium microlepis*), a species endemic to Malawi, is also endangered.

Table 4. Key Wildlife Found in Targeted PAs

Characteristics	Nyika National Park	Vwaza Wildlife Reserve	Nkhotakota Wildlife Reserve
Wildlife	Zebra, roan, antelope, eland, reedbuck, bushbuck, common duiker, bush pig, leopard, hyena and a small population of elephants	Buffalo, elephants, roan antelope, greater kudu, Liechtenstein's hartebeest, eland, and impala. Lake Kazuni supports a population of hippo and crocodiles.	Lion, elephant, buffalo, leopard, kudu, zebra, hippo, crocodile, warthog, roan & sable, antelope and 8 other antelopes, 160+ species of birds. Bua river is a breeding haven for 2 endemic fish species: Mpasa (lake salmon) and Sanjika.

Source: TLC, 2009[i]

1.1.4.2.1.3   Endemic Species

Endemic Species in Nyika National Park

Nyika is home to an endemic sub-species of Burchell's Zebra (*Equus burchelli crawshai*). Several species of birds are endemic to Nyika, including: a subspecies of the red winged francolin (*Scleroptila levaillantii*); the greater double-collared sunbird (*Cinnyris afer)*; and the Baglafecht weaver (*Ploceus baglafecht*). Two other bird species are found nowhere else in Malawi: the Red-tufted Malachite Sunbird (*Nectarinia johnstoni*) and Mountain Marsh Whydah (*Euplectes psammocromius*) (Rough 1989).

Endemic amphibian species include: Nyika dwarf toad (*Bufo taitanus nyikae)*; Nyika squeaker *(Arthroleptis xenodactyloides nyikae)*; and black striped sedge frog (*Hyperlorius quinquevittatus merdensi*) (Mill 1979; Johnson 1989; Nyika-Vwaza Trust 2011). Three reptiles are also endemic to the plateau: goetzei Nyika chameleon (*Chameleo goetzei nyikae)*, Nyika skink (*Mabuya varia nyikae),* and Hilda's Skink (*Mabuya hildae*) (Mill 1979; Rough 1989; Johnson 1989).

Seven species of butterflies are endemic to Nyika and nine additional species occur nowhere else in Malawi (Department of National Parks and Wildlife 2004a).

Endemic plants include one species of evergreen juniper (*Acokanthera laevigata*) and a new species of epiphytic fern occurring in the Zovochipolo area of the park (Department of National Parks and Wildlife 2004a). Of the 215 known species of orchid, 12 species are endemic to the plateau and 30 others are found nowhere else in Malawi.

Endemic Species in Vwaza Marsh Wildlife Reserve

Vwaza Marsh may be the only protected area in which the white-winged babbling starling (*Neocichla gutturalis*) is known to live (Department of National Parks and Wildlife 2004b).

Endemic Species in Nkhotakota Wildlife Reserve

The Malawian waterbuck represents a subspecies of Waterbuck (*Kobus ellipsiprymnus*) that has yet to be described and is only found in Nkhotakota Wildlife Reserve ((Mawaya et al. 2011)).

1.1.4.2.1.4   Areas with Significant Species Concentrations

Wetlands and forests within protected areas support many species during any time in their lifecycle. These species will be protected through Project implementation.

Significant Species Concentrations in Nyika National Park

Nyika is an important breeding ground for several species of rare or endangered birds, including the Denham's Bustard (*Neotis denhami*), considered near threatened, and the Wattled Crane (*Bugeranus carunculatus*), considered nulnerable on the IUCN Red List. Nyika also supports the world's largest breeding population of the Endangered Blue Swallow (*Hirundo atrocaerulea*).

Protection of catchment areas of the rivers and streams of the Nyika Plateau ensures the survival of the 27 species of fish which inhabit these rivers, even outside the park (Johnson 1989). The North Rukuru River, which originates on the Nyika, is an important spawning river for the Lake Salmon *Opsaridium microlepis*; protection of its catchment ensures the clean silt free water that is required as a spawning habitat.

Other mammals of special importance in Nyika National Park include: Blue Monkey (*Cercopithecus mitis*); African Elephant (*Loxodonta Africana)*; Blue Duiker (*Philantomba monticola*), Red Duiker (*Cephalophus natalensis*); Burchell's Zebra (*Equus burchelli crawshai)*; and three species of shrew which may be endemic to Malawi.

Significant Species Concentrations in Vwaza Marsh Wildlife Reserve

A number of bird species waterfowl and of Palaearctic and intra-African migrants rely on the forests and wetlands of Vwaza seasonally and during migration (Mauambeta et al. 2010).

Significant Species Concentrations in Nkhotakota Wildlife Reserve

The Bua River is a breeding area for lake salmon (mpasa) and Sanjika, both endemic species of fish. These fish require clean, gravel surfaces to spawn. Significant Landscape-level Areas with Natural Species Concentration Composition

The Project Area is large enough to support significant concentrations of species that require large habitats to survive. Without Project implementation many of ecosystems will become fragmented due to resource extraction.

Significant Landscape-Level Areas in Nyika National Park

The forest patches of Nyika contain more bird species than any similar forests elsewhere in Malawi, and some bird species reach the most southerly limit of their range in the park. Nyika is also home to the highest concentration of large mammals in Malawi and has the highest concentration of Roan Antelope (*Hippotragus equines*) on the African continent. Nyika also has the highest concentration of Leopards (*Panthera pardus*) in Malawi, and possibly in Central Africa (Mawaya et al. 2011).

Significant Landscape-Level Areas in Vwaza Marsh Wildlife Reserve

African Wild Dog may be making its way back into the park from eastern Zambia

Significant Landscape-Level Areas in Nkhotakota Wildlife Reserve

Nkhotakota Wildlife Reserve is largely undisturbed and home to small populations of Elephant (*Loxodonta Africana)*, Lion, Leopard (*Panthera pardus*), Buffalo (*Syncerus caffer*), Zebra (*Equus burchelli crawshai)*, Blue Monkeys (*Cercopithecus mitis)*, and eleven species of Antelope. The reserve also serves as an important habitat for the birds from nearby forest reserves.

1.1.4.2.2 Threatened or Rare Ecosystems

High Conservation Value areas described as ecologically significant contain rare species or provide habitat to these species. Without Project implementation these areas are threatened by agents and drivers as described above.

1.1.4.2.3 Areas that Provide Critical Ecosystem Services

Overall, Malawi's economy is dependent and based on the biological diversity and services provided by its ecosystems. The economy depends on the use of biodiversity as a source of raw materials for agro-industrial development and exports. For example, it is estimated that the fisheries, tourism and forestry sector each contribute between 1.5 and 4% towards GDP. Aquatic ecosystems constitute about 22% of the total surface area of Malawi and are mostly comprised of Lake Malawi, Lake Malombe and Lake Chilwa – as well as rivers, small water bodies (e.g. lagoons) and other wetlands e.g. marshes and swamps (Department of Environmental Affairs 2010). Each of the three protected areas contains aquatic ecosystems and are important for different reasons (see below).

Additionally, the forests in these areas provide numerous ecosystem services. The overall economic value of these ecosystem (i.e. nutrient recycling, provision of clean water and air, control of the micro environment and erosion) services is more difficult to estimate. However, the loss of these habitats has resulted in the Government of Malawi spending billions of dollars. For example, degradation of the Shire River catchment leads to clogging of electricity supply which leads to massive power cuts costing Malawi billion ofdollars in maintenance and business failure. The Malawi Poverty and environment Initiative economic study estimated the cost of unsustainable use to be equivalent to giving up about 5.3% of GDP each year. Taking into consideration the MGDS aims for total annual GDP growth of 6%, MPEI Economic study report hypothesized that Malawi would have been richer by MK 27.1 billion (USD195 million) each year in 2007 prices if soil, forest, fishery and wildlife resources were used sustainably (Environmental Affairs Department 2010).

Critical Ecosystem Services in Nyika National Park

Nyika National Park protects an important regional watershed which provides water to the Northern Region for domestic consumption, irrigation and hydro-power generation (Department of National Parks and Wildlife 2004a).

Critical Ecosystem Services in Vwaza Marsh Wildlife Reserve

The Vwaza Marsh is an important location for waterfowl and large mammals.

Critical Ecosystem Services in Nkhotakota Wildlife Reserve

The wildlife reserve is an important catchment area for Lake Malawi because three major rivers (Bua, Dwangwa and Kaombe) pass through it. Bua River is important because it is one of the few rivers around the lake where lake salmon, *Opsaridium microlepis* and *O. microcephalum* continues to spawn.

1.1.4.2.4 Areas Fundamental for Meeting the Basic Needs of Local Communities

Biodiversity and intact ecosystems contribute to the well being of 90% of Malawi's population. The majority of Malawians depend on natural resources for fuelwood, poles and timber, bamboo, crafts, thatching, grass, medicines, spices, flowers, cosmetics, edible fruits, tubers, vegetables, mushrooms, fodder, and extractives (dyes, oils, gums, latex, resins). Grass is used extensively for thatching, especially in rural areas. Additionally, community members depend on the protected areas to meet their basic needs, particularly in times of food scarcity. Villagers collect a range of timber and non-timber products to supplement agricultural income or to source traditional foods and medicines that aren't available in markets.

Firewood and charcoal remains the dominant source of energy accounting for approximately 90% of the household and industrial energy requirement (Environmental Affairs Department 2010). At the household level wood is also used for construction and furniture.

Finally, protected areas contain watersheds and renewable natural resources critical to human and animal life by supporting the soil, water and vegetative base.

Nyika National Park

Nyika's high altitude flower meadows produce commercial volumes of high quality honey, with the potential for export and/or organic certification in the future. Project proponents are also encouraging the processing and sale of wild mushrooms and fruits as a potential income-generating activity for communities.

Vwaza Marsh Wildlife Reserve

Similar to Nyika National Park due to the geographic proximity of the communities living near these areas. Fish from the river provide an important source of protein for communities

Nkhotakota Wildlife Reserve

The area in and near the reserve contains a good environment for beekeeping and honey production, and considerable volumes of wild mushrooms are harvested annually. The DNPW initiated collaborative management activities and COMPASS supported the development of natural resources management associations and small-scale commercial enterprises for honey, mushrooms, and dried fruit. The reserve is also important for sustaining fisheries in Lake Malawi, since the reserve protects an important watershed for the lake as well as spawning grounds for many fish species.

1.1.4.2.5 Cultural HCV Areas

Cultural HCV areas are areas that are significant to local and indigenous communities. Cultural HCV areas are either: (1) areas that help meet the basic needs of communities or provide critical ecosystem services HCV5) or (2) areas of traditional, cultural, ecological, economic, or religious significance as identified by the local communities (HCV6). .

Malawi has not undergone a national process for defining HCV areas at the national level, which requires specific consultation techniques to determine whether a forest is fundamental to meeting any basic needs (HCV5) or critical to the community's cultural identity (HCV6). However, based on the social surveys and PRAs that are part of the Project, the Project Areas would meet the qualifications of HCV5 and possibly HCV6. Specifically, Nyika National Park is a major tourist destination for Malawi and provides an important source of income for surrounding communities. Within the park is found Lake Kaulime which served as a spiritual sanctuary. It is believed that the Sanctuary harboured a serpent and a human like being through which people communicate with God. There is also Fingira Care in the lake where stone artefacts and shells are found. In addition there is an area, 16km from Chelinda, where iron smelting was done (UNESCO 2000).

 All three protected areas are sources of food, fuelwood, and shelter.

1.2   Baseline Projections

1.2.1   Description of Most Likely Land-Use Scenario in Absence of the Project

Forest cover[2] in the Project Areas is approximately 217,270 ha and is declining rapidly as a result of deforestation caused by population pressure and poverty. Fuelwood collection, charcoal production, and clearance for agriculture, are some of the only sources of income for the increasing number of poor rural

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[2]Since no definition has been published by the Malawian Designated National Authority (DNA) the definition of forest developed by Food and Agriculture Organization (FAO) has been used. According to the FAO, Forests are: land with a tree canopy cover of more than 10 percent and area of more than 0.5 ha Forests are determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 m. Forest includes natural forests and forest plantations.

households and result in direct removal of forest biomass. In the absence of Project deforestation will continue at the current rate and will likely accelerate over the next decade due to the growing population.

1.2.1.1 Underlying Causes of Deforestation

A detailed socio-economic baseline survey was conducted in the three Project Zones over thirteen weeks from December 2010 to March 2011 (Phiri, Mapemba, and Sopo 2011). Most households living around these PAs are characterized by dire poverty, undertaking practices that are destructive to the same resources upon which their livelihoods depend. The main occupation in the Project Zones is small-scale farming (92% of households) followed by small-scale or barter trade (48-50% of respondents).

Average annual incomes in the Project Zone ranged from MK 66,798.00 (~USD248) to MK 68,548.80 (~ USD254). Food insecurity is chronic in many areas in Malawi. In the Project Areas, one-fifth to one-quarter of the survey respondents reported running short of food the previous year. The worst months for food shortages and insecurity occur between December and March, at the start of the planting season and before food crops are mature enough to harvest. Almost without exception, fuelwood is the main source of energy for cooking and heating households.

In addition, most communities have limited access to support services such as health care, education, agricultural extension, inputs, markets and tele-communications because they reside in remote areas with poor roads and infrastructure. Survey respondents reported lacking access to training in basic skills needed to run small enterprises.

1.2.1.2 Overview of Deforestation Drivers and Agents

Social appraisals carried out by TLC identified 16 distinct deforestation drivers, and 11 deforestation agents operating in the Project Areas (TLC, 2011) (Table 5).

Table 5. Summary of Deforestation Drivers and Corresponding Agents

Driver / Agents	Hunters/Poachers	Local Communities	Local Farmers	Migrants	Tobacco farmers
Collection of wood for charcoal		●		●	
Conversion of forest to small-scale agriculture			●	●	
Forest fires by hunters (mice hunters)	●				
Forest fires for other anthropogenic reasons	●				
Other				●	
Wood and poles for construction and domestic use			●		
Wood for cooking and heating locally				●	
Wood for tobacco curing			●		●

1.2.1.3 Description of Deforestation Drivers

Charcoal is a leading driver for deforestation in Malawi, and is a prominent source of income for many poor rural communities. The charcoal trade is worth an estimated MK 5.78 billion (USD 41.3 million) per year – almost the same value as the nation's tea industry[3]. Trees are seen as a relatively free resource,

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[3] www.ifmslp.org/reports/ifmslp_charcoal_study_options_25_aug.doc

and other input costs of charcoal are minimal. Charcoal is not used in rural areas as it is viewed as a "cash product." The main advantages for using charcoal are that it contains smaller amounts of volatile compounds for indoor cooking, lights easily, burns uniformly and at a higher temperature, is light to transport, and is culturally accepted. Charcoal is made in rural areas and is transported to urban centers. Charcoal can be seen for sale along almost every major road in Malawi.

Due to the extreme exploitation of forests for charcoal production, the Malawian government made the production of charcoal illegal, unless it is produced from a sustainable source. Sustainable charcoal makers must be issued a permit (proving that wood used comes from a sustainable source), which is also carried/ used by the seller. Though this is a national law, the government has issued no permits so far, and funds or capacity for enforcement are insufficient. Despite controls, large-scale charcoal businesses buy significant quantities of charcoal in rural areas and transport it to cities by truck. Any standing tree has the potential to be made into charcoal; it is created in rural areas, transported, sold, further transported and re-sold, etc. Pressures on standing trees are greater in areas near cities, and along roads leading to them.

Figure 8. Wood charcoal is sold along roadsides and is used for domestic heating and cooking in urban areas

1.2.1.3.1 Conversion of Forest to Small-scale Agriculture.

Approximately 85% of Malawi's population lives in rural areas, making Malawi one of the most densely populated countries in Africa (per km²). Currently, there is a land rush where individuals or families move from populated areas to more rural areas, seeking permission from village chiefs for access to land. If granted, these new farmers are not treated as migrant workers, but are incorporated into the village community. Migrants are most commonly entering areas near Nkhotakota, where as many as twelve new families per year join a village. In rural communities, shifting slash-and-burn agriculture is practiced. New migrant farmers are surprised by this activity, as land is limited and must be used long-term. Often, new settlers from more urban areas have better land practices, and are more knowledgeable about forest protection. Most landholdings in Malawi are 0.4 ha per family. A village commonly consists of 30 families (ranging from 10-60) and covers an area totaling about 5 ha.

Figure 9. Forest conversion as a result of slash-and-burn agriculture, practiced outside of Nkhotakota Wildlife Reserve

1.2.1.3.2   Fires to Hunt Mice

Mice are a common food in the Lilongwe Plains and in surrounding areas. Mice vendors, usually boys, sell boiled mice along the roadside (Figure 13). Though mice prove to be a good source of protein, hunting practices are very destructive. In the dry season, mice hunters set fire to fields to find mouse holes. In the burnt field, mouse holes can easily be spotted and the mice dug up. Fire is also regarded as a good way to burn off weeds, and the smaller fires started by mice hunters are left to burn. Fire is a culturally accepted land management tool, though most Malawians are unaware of the long term damage caused by constant fire. Many areas of south central Malawi are distinctly blackened with evidence of fires in the dry season. Fire is so prevalent in some regions in Malawi that Total LandCare created a radio jingle, i.e., a short catchy song about not starting fire and about how damaging it can be.

Miombo ecosystems, which contain many fire adapted species, are quite resilient to fires. However, given that the fire return interval is so frequent due to arson, these ecosystems are unable to recover. The *miombo* woodland that once existed over the majority of Malawi has been greatly reduced.

Figure 10: Fires are set to hunt mice, which are caught, cooked and sold along roadsides

1.2.1.3.3   Fires for Other Anthropogenic Reasons

Fires to concentrate animals inside protected areas. Hunting for bush meat is illegal in Malawi. However, hunting for wild game often occurs - some on an as-needed basis - while other hunting is full time. Socially, hunting game is not widely accepted. Hunters are commonly equipped with a rifle and

poorly made bullets, and must concentrate animals for increased accuracy. Fires used to concentrate animals must cover a very large area.

Hunters also burn areas to attract game to new shoots that regenerate after a burn. This is very prevalent in Nkhotakota, where the presence of fire is common on the highlands, and the population of ungulates is fairly large. Though these highlands are a natural savanna, arson fires affect both grasslands and burn into the surrounding forestlands. Deforestation caused by fire associated with hunting is present in all Protected Areas within the Kulera Project except for Mkuwazi. Hunting is almost exclusively done within Protected Areas, as this is where most wildlife can be found.

Figure 11. Fires are often used to concentrate animals inside of protected areas, such as this roan antelope in Nyika National Park

1.2.1.3.4 Other

This captures two main non-anthropogenic deforestation drivers, which include forest destroyed by elephants and a flood event that was estimated to destroy ten hectares of forest in the Project Area. These drivers are not directly addressed by the Project activities as they are from natural causes.

1.2.1.3.5 Wood and Poles for Construction for Domestic Use

Wood and poles are used to construct houses, tobacco drying sheds, fencing, concession stands along roads, and pens for domestic animals (Figure 3). In general, Malawians prefer brick houses to houses built of wood and cob/clay, which are used by poorer communities and those building temporary houses. These temporary buildings are not of high quality, but the wood used lasts for many years. Wood used for building materials must be taller, straighter, and thicker then fuelwood to support the weight of construction. Wood used for construction and brick making accounts for 10% of wood consumption in Malawi.

Figure 12: Wood and poles used for domestic construction

1.2.1.3.6 Wood for Cooking and Heating Locally

Rural Malawians rely on fuelwood, often gathered by girls and women, for domestic cooking and heating. Due to the need for fuel, land surrounding villages that once supported *miombo* woodland are heavily harvested, and most trees are reduced to multiple shoots below two meters. Cooking is done on inefficient stoves that are usually made up of three rocks or clay mounds to balance a cooking pot. Fuelwood must be gathered, on average, every three days, sometimes at great distances. Fuel-efficient stoves greatly reduce the need for fuel and improve lives of girls and women. Fuel-efficient woodstoves are desired by many Malawians, but they often lack the knowledge, incentives to overcome tradition and/or capital to cover the costs of stove creation. Wood used by rural communities for cooking and heating accounts for 57% of wood consumption in Malawi.

Figure 13: In rural areas, women are responsible for collecting and transporting firewood used for cooking and heating

1.2.1.3.7 Tobacco farmers

Tobacco is the major cash crop of Malawi, and is grown in many regions throughout the country. Much of the analysis on the returns of tobacco to the Malawian economy neglects inclusion of input costs of tobacco production. If all of the input costs of tobacco, such as labor, transport and taxes were taken into account, farmers might grow alternative crops. Tobacco is harvested from January to March/April by removing two to three leaves per plant every ten days, totaling twelve leaves per plant. The average size of a single-owner tobacco field is 0.2 ha or less. For proper storage and sale, tobacco leaves must be dried. Many tobacco farmers dry their leaves together in long drying sheds. This is done by hanging the leaves in an open shed, in which they are heated and smoked by wood-burning fires. Because tobacco is such a valued crop in Malawi, large quantities of fuelwood are needed for drying tobacco. A total of 10% of all wood consumed in Malawi is used for tobacco leaf curing and tobacco shed construction.

Figure 14. Tobacco leaf bundles that have been cured with fuelwood

1.2.1.4   Description of Deforestation Agents

1.2.1.4.1   Hunters/Poachers

Game hunters and poachers inside park will light fires on all sides to concentrate the animals and make it easier to hunt. However, these activities do not happen in the populated areas are the parks, and they often happen deep (10km) within Protected Areas. However, in cases where the fire burns out of control and into a 5 km zone of the Project Area, this can cause forest loss in the Project Area.

Though this practice is generally undertaken by a small segment of the population, those hunters who do engage in this practice pass on the technique through generations and thus, the practice continues. This is particularly problematic in Nyika and Vwaza, in spite of local educational efforts on the part of DNPW and NVA that attempt to demonstrate the negative environmental and social impacts of this practice.

Hunters also set fires in order to reduce groundcover to expose mouse burrows, which are commonly sold boiled at roadside stands and provide a valuable source of animal protein.

1.2.1.4.2   Local Communities

Charcoal provides an important income source for many community members in rural areas. The overall cost of inputs associated with charcoal production is low, particularly as trees are viewed as a "free" resource. However, the consumption of charcoal by rural communities is minimal since it is viewed as a cash product. Rural communities instead produce this easy-to-transport product for use by urban dwellers.

Because of the ease of production and broad cultural acceptance of charcoal as a fuel source in Malawi, the government has been forced to restrict charcoal production, making this activity illegal unless produced from a sustainable source. Community members must receive a permit to engage in sustainable charcoal production, but institutional and enforcement capacity are limited such that no permits have yet been issued, making any standing tree a potential target for charcoal production.

1.2.1.4.3   Local Farmers

Local Farmers are one of the leading agents of deforestation and degradation. Local farmers clear areas of the forest for small-scale agriculture. Small scale agriculture is done by individual farmers on their land, as well as on village or community land with approval from the Chief. Likewise, settlements are established on forestland. If anyone outside of the community tried to encroach on community land without approval from the chief, they would be kicked off by community members.

Fuelwood collection is a large enterprise throughout many areas of Malawi. In addition to its domestic heating and cooking applications, fuelwood is in high demand as an input to the tobacco curing process. Tobacco is a major cash crop in Malawi, though it is clear that local farmers do not have 'perfect information' regarding the real costs associated with tobacco production; if they were, they may choose to engage in a less costly livelihood activity. In order to cure the tobacco, large quantities of fuelwood are required to thoroughly dry the leaves. This activity undertaken by local farmer's accounts for ten percent of all wood consumed.

Local farmers also rely on trees as a source of construction material, though the quality and maturity of wood produced often needs to be much greater than other applications of forest products in order to withstand the demands of construction and long-term exposure to the elements. Though houses constructed from brick, rather than wood, are most desired in Malawi, poorer farming communities, as well as farmers in transition, rely on wood to construct both permanent homes and temporary shelters.

1.2.1.4.4   Migrants

Migration in Malawi is somewhat atypical in comparison to other countries, and community members tend to belong to a village that is overseen by both a group village headman and a chief. Marriage and population growth are two contributors to migration in Malawi, as well as the movement of Chewa migrants from Central to Northern Malawi to work on tobacco farms. These migrants are often reliant on wood to construct both permanent and temporary housing, and the livelihood activities in which they become engaged in their new location, such as tobacco farming, may require fuelwood as an input.

1.2.1.4.5   Tobacco farmers

Most of the tobacco Project Zone is dried in barns or sheds and requires large quantities of fuelwood to cure. Tobacco is a major cash crop in Malawi, though it is clear that local farmers do not have 'perfect information' regarding the real costs associated with tobacco production; if they were, they may choose to engage in a less costly livelihood activity. In order to cure the tobacco, large quantities of fuelwood are required to thoroughly dry the leaves. This activity undertaken by tobacco farmer's accounts for ten percent of all wood consumed within Malawi.

1.2.2   Project Benefits that would not Have Occurred in Absence of Project

The additionality of the Project is based on the "VCS Standard: VCS Version 3" Project Method.

1.2.2.1   Step 1: Regulatory Surplus

Malawi is a UNFCCC non-Annex I countries and this Project is not required by, laws, statutes, or regulation. While the Project is in protected areas, the government does not have the capacity or resources to systematically and consistently enforce the projected status of the Project Areas from increased population pressures.

1.2.2.2   Step 2: Implementation Barriers

The Project faces a number of barriers that would prevent its implementation without the generation of income from emission reduction sales.

Investment Barrier

Foremost, the Project faces a financial barrier to implementation due to the fact that while the Project produces alternative incomes streams for communities, these income streams are localized and cannot be used to implement the other Project activities that reduce deforestation. Thus, the successful implementation and on-going management of the Project require the generation of other funding streams from the sale of emission reductions. While USAID provided funding for the initial years of Project design and implementation, as well as the carbon development, this grant was set to expire in September 2012. The Project developers received a one year and 3-month no-cost extension, which will expires in December 2013.

While donor funding and direct investments by Project proponents have thus far been essential to enabling Project development, Project activities are unable to continue without revenues from the sale of emission reductions. See Project financial projections Section 1.3.11.

Technical and Capacity Barriers

Funds from emission reduction sales will enable the implementation of Project activities for the lifetime of the Project and will support removing the technological and capacity barriers by providing training, capacity development, workshops, and technical assistance to support the adoption of new technologies, such as cookstoves, that reduce deforestations. These funds will also support development of local capacity for the on-going monitoring of carbon stocks.

Institutional Barriers

Additional barriers to Project implementation are institutional or related to local tradition and prevailing practices. These include a lack of enforcement of forest and land-use legislation in the Project Areas, a long history of shifting agriculture, customary land use, unclear or informal land tenure, demographic pressure on the land, and the presence of illegal resource use practices that are difficult to regulate and control. Evidence of these barriers was confirmed through data gathered from household surveys and participatory rural appraisals carried out in the Project Areas and broader geographic area. This data will be made available during the validation process.

Through the development of formal governance structures for; i) co-management of the protected areas between the DNPW and the Community Associations, ii) development of Community Associations, which support village level engagement, and iii) implementation of a REDD+ Public Private Partnership Entity the Project is implementing new institutional frameworks. These frameworks provide the on-going operational and financial governance necessary to secure tenure and distribute benefits for successful management of the protected areas.

1.2.2.3 Step 3: Common Practice

The Project is not common practice in Malawi as Malawi has no other verified REDD+ projects in the country. Additionally, there are no activities that are similar in scale and scope to those proposed in the Project Areas. For more information on the activities that will be implemented, see Section 1.3.2).

1.2.3 Calculate the estimated carbon stock changes associated with the 'without project' reference scenario described above.

The table below provides the estimated baseline emissions using the VCS methodology revised VM0006.

Table 6: Summary of GHG Emissions/Removals

Year	Estimated baseline emissions or removals (tCO2e)
2008	650,268
2009	661,425
2010	672,155
2011	682,292
2012	691,924
2013	701,133
2014	709,480
2015	717,510
2016	725,070
2017	732,027
2018	728,827
2019	725,193
2020	720,907
2021	717,553

2022	712,623
2023	708,340
2024	703,990
2025	698,285
2026	693,697
2027	689,060
2028	670,411
2029	650,191
2030	630,884
2031	610,460
2032	590,583
2033	568,952
2034	545,601
2035	521,136
2036	492,940
2037	451,167
Total	**19,774,082**

1.2.4   How the 'Without Project' Reference Scenario would Affect Communities in the Project Zones

From an environmental perspective, mounting population pressures are aggravating the situation due to rising demands for land, food, water, energy and other basic necessities - yet little is being done to care for the source of these essential needs - the natural resource base. Land holdings are shrinking in size and becoming more fragmented. Traditional practices that preserved the integrity of the natural resource base are dying out. Marginal areas have been brought under cultivation, often in continuous monocultures with no fallow periods and few inputs. Degradation of the environment has reached alarming proportions. Loss of topsoil averages over 20 tons ha-1 per annum (World Bank 1992), but 100 tons ha-1 are frequent on steep hillsides. Between 1972 and 2005, Malawi's forest cover was cut in half from increasing demands for farmland and wood (Ministry of Forestry and Natural Resources 1993; Menon 2007). Until recently, most of this occurred on customary land where trees are regarded as a free resource. Encroachment into protected areas with exploitation of their resources is now common due to difficulties by Government to enforce its policies. The attendant loss of biodiversity is accompanied by adverse changes in climatic and hydrological regimes with diminished stream flows, increased flooding and the siltation of rivers, dams, and lakes.

Rising poverty and environmental degradation are eroding the capacity of the country to sustain livelihoods and to promote economic growth. In their struggle to survive, people are unable to make the critical trade-off between sound resource use and immediate short-term needs.

Malawi's protected areas are a priority concern of Government and many donors. Apart from many unique and endemic species of plants and animals, protected areas contain watersheds and renewable natural resources critical to human and animal life by supporting the soil, water and vegetative base. From an agricultural perspective, these functions are instrumental in sustaining the productivity of crops and animals and mitigating harmful environmental, pest and disease problems. Malawi's protected areas are now in grave danger with serious implications for the country's supply of food, water, shelter and energy. The results have far-reaching consequences on agriculture, fisheries, tourism, infrastructure, employment, industry, trade, and health. Given Malawi's dependence on a limited resource base, continued degradation of its protected areas threatens to deliver a crippling blow to its people and economy.

1.2.5 How the 'Without Project' Reference Scenario would Affect Biodiversity in the Project Zones

In the absence of the Project activities, it is likely the forest habitat in the Project Areas will be significantly reduced through fuelwood collection, land clearing, illegal felling of timber, fires and other activities (see Section 1.2.1 for a complete list of deforestation drivers). In addition forest degradation will reduce the density of the understory vegetation. The reduction of key habitat and refugia will place pressure on already stressed flora and fauna that rely on these intact habitats for their survival (see Section 1.1.4.2.1 and 0 for a description of the biodiversity in the Project Areas). Additionally, a biodiversity baseline assessment uncovered significant evidence of poaching in all of the Project Areas including trails, poachers base camps and fireplaces, animal drying racks, dead elephant skeleton, and snare pegs for trapping animals (Figure 15andFigure 16). In Nkhotakota, illegal fishing of the Lake Salmon *Opsaridium microlepis* and *O. microcephum* which is one of the endangered cyprinid fish species in Malawi (Figure 17).

Figure 15. Evidence of Poaching in Nyika National Park: Poachers Roasting place (left) and Poachers' fireplace in Chisimuka area (right)

Figure 16. Evidence of Poaching in Vwaza Wildlife Reserve: Fireplace for poachers in Zolokere Area (left); bird trap (center); and elephant bone (right)

Figure 17. An Illegally fished lake salmon (left) and pools where illegal fishing is done (right) in Bua-Mbewa Area in Nkhotakota Wildlife Reserve

Without the Project activities, including greater enforcement and control of illegal activities, rampant poaching and deforestation will continue and almost certainly lead to local extinction of a number of IUCN threatened species and endemic species found in the Project Areas (see Sections 1.1.4.2.1.2 and 1.1.4.2.1.3 for a list of threatened and endemic species found in the Project Areas). This includes: bird species such as the the Blue Swallow (*Hirundo atrocaerulea*), Wattled Crane *Bugeranus carunculatus*); mammals such as the African Elephant (*Loxodonta Africana*), African Wild Dog (*Lycaon pictus*), and African Lion (*Panthera leo*); and fish such as Lake salmon (*Opsoridium microlepis)*, a species endemic to Malawi, is also endangered.

1.3   Project Design and Goals

1.3.1   Summary of the Project's Major Climate, Community and Biodiversity Objectives

1.3.1.1   Climate objectives

The Project is designed to avoid further deforestation and degradation in the Project Areas, which will lead to a significant reduction in GHG emissions over the 30-year Project life. The Project expects to generate the net emission reductions in Table 7.

Table 7. Project Scale and Estimated GHG Emission Reductions and Removals

Project	
Average Annual VCUs	513,666

Activities that are expected to reduce GHG emissions include" strengthening of land tenure and forest governance;   support for sustainable forest and land use management;   forest protection through patrolling, social fencing and maintenance of forest boundaries; fire prevention and suppression activities; reducing fuelwood consumption through use of fuel efficient cookstoves; creation of alternative sources of fuelwood through agroforestry and farm woodlots; and intensification of agriculture, and development of local enterprises (see Section 1.3.2 for a complete description of Project activities). All of these activities are expected to be eligible GHG reduction activities under the VCS and are additional to what would be achieved in the absence of the Project. The revenue generated from the sale of emission reductions is expected to support the implementation of the above-mentioned activities.

In addition to direct revenue, increased storage of carbon in soils and vegetation has co-benefits of increased productivity of natural resource based enterprises, as well as enhancement of ecosystem services such as biodiversity and water quality protection, which have global and downstream benefits (TLC, 2009).

1.3.1.2   Community objectives

The Project seeks to improve governance of the three protected areas through a participatory, decentralized structure that provides economics incentives to support sustainable natural resource management. The Project will improve rural livelihoods around the borders of protected areas under a framework that promotes increased food security, diversification; sound resource management, and improved incomes. The ultimate goal is to transform livelihoods from subsistence survival to thriving rural enterprises that are self-sufficient.

Increased rural incomes are expected from the development of eco-tourism and other enterprises among local producers and entrepreneurs to produce, process and market agricultural and natural products (e.g. coffee, macadamia). A value chain approach is being used to evaluate the progress and status of model for replication: Public awareness campaigns, on-farm demonstrations and farmer-to-farmer exchanges will increase adoption of successful interventions within and beyond the target areas. Seed multiplication programs of food and high value crops will increase the availability of quality planting material at lower costs as well as numbers of farmers involved. Finally, training, technical support and funding for forest-based livelihood activities (e.g. honey production) along with the extension and adoption of conservation agriculture practices will be provided by the Project. The DNPW will continually monitor community impacts through social surveys throughout the life of the Project.

1.3.1.3   Biodiversity objectives

The Project will contribute to the protection and conservation of Malawi's most important protected areas, which are home to many threatened and endemic species (see Section 1.1.4.2.1 for a complete description of biodiversity) and considered High Conservation Value areas, by increasing the capacity of local communities located in the Project Zones to participate in sustainable resource management. This decentralization of natural resource management will include increased capacity of district authorities,

traditional authorities, community-based organizations (e.g. NVA and Nawira Wildlife Reserve Association) and other stakeholders to support biodiversity initiatives with rural communities. The biodiversity of the target protected areas will be more secure from efforts to a) promote a sound participatory structure of governance that engages all stakeholders based on mutual interests, and b) reduced incentives for encroachment and exploitation by improving the livelihoods of border communities and their environment. Communities will also engage in bush fire prevention and management, through their co-management agreements with the DNPW, which will help to facilitate forest regeneration. The Project proponents will facilitate community dialogue and provide technical support regarding effective practices for conserving flora and fauna. Finally the DNPW will conduct regular biodiversity monitoring (per VCS and CCB requirements) with the support of Project staff.

1.3.2 Project Activities with Expected Climate, Community and Biodiversity Impacts

The Project is targeting approximately 217,270 hectares of forest located in a 5 km band inside of three critical protected areas in Malawi by working with the DPNW and more than 45,000 households, or more than 225,000 people (assuming 5 persons per household) living within 10 km outside the protected areas.

The protected areas, now islands of standing forest in a heavily degraded landscape matrix, are rapidly being degraded by communities living alongside these protected areas. In order to reduce deforestation and forest degradation, the Project proponents, working in partnership with TLC, will be implementing activities designed to improve the capacity of the DNPW and communities to manage and protect park resources, and to reduce the communities' needs for park resources through building alternative livelihoods.

Specifically, the Project proponents will support activities in the Project Zones that will reduce pressure on the Project Areas:

- Strengthening land-tenure and protected area governance;
- Support for the development and implementation of sustainable forest and land use management plans;
- Forest protection through patrolling, social fencing and maintenance of forest boundaries;
- Fire prevention and suppression activities;
- Reducing fuelwood consumption and increasing energy efficiency by introducing fuel-efficient woodstoves;
- Creating alternative sources of fuelwood through agroforestry and farm woodlots; management
- Sustainable intensification of agriculture on existing agricultural land; and
- Developing local enterprises based on sustainably harvested NTFPs such as honey, coffee, macadamia, and livestock.

Each of these Project activities is designed to target one or more of the identified deforestation and degradation drivers (see Table 8).

Table 8. Project Activities and the Targeted Deforestation Drivers

Driver of Deforestation / Project Actions	1. Strengthening of land-tenure and protected area governance.	2. Support for the development and implementation of sustainable forest and land use management plans.	3. Forest protection through patrolling, social fencing and maintenance of forest boundaries	4. Fire prevention and suppression activities	5. Reducing fuelwood consumption and increasing energy efficiency by introducing fuel-efficient woodstove	6. Creation of alternative sources of fuelwood through agroforestry, farm woodlots management	7. Sustainable intensification of agriculture on existing agricultural land	8. Development of local enterprises based on sustainably harvested NTFPs such as honey, coffee, macadamia, fruit prodcution, and livestock	TOTAL REDUCTION
Wood for cooking and heating locally	5%	5%	25%	0%	20%	25%	0%	5%	85%
Wood and poles for construction and domestic use	5%	5%	50%	0%	0%	0%	0%	20%	80%
Wood cut into planks for regional sale	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Wood for brick making/kiln	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Wood for tobacco curing	0%	5%	50%	0%	0%	0%	0%	20%	75%
Fuelwood for furniture and woodcarving	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grazing in forest	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Forest fires for other anthropogenic reasons	0%	0%	50%	25%	0%	0%	0%	10%	85%
Collection of understory/grass for thatch and fences	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Conversion of forest to small-scale agriculture	10%	10%	45%	0%	0%	0%	25%	10%	100%
Conversion of forest to settlements	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Forest fires by hunters (mice hunters)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Collection of wood for charcoal	10%	10%	60%	0%	0%	0%	0%	20%	100%
Fire to contain animals inside the park	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cutting wood from boat making	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fires to collect honey	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Net Effect on Total Deforestation (Excl. Leakage)	**1%**	**3%**	**50%**	**11%**	**0%**	**0%**	**1%**	**15%**	**0%**
Net Effect on Total Forest Degradation	**5%**	**5%**	**25%**	**0%**	**20%**	**25%**	**0%**	**5%**	**0%**

n/a = driver not active in Project Area

1.3.2.1 Strengthening of Land Tenure and Protected Area Governance

Strengthening land tenure and providing clarity on governance structures for protected areas management are critical first steps in protecting reserves from illegal encroachment. The Project will provide support to strengthening land tenure and forest governance by creating and improving participatory, decentralized governance through co-management of the protected areas between the DPNW and Community Associations representing over 45,000 villages adjacent to protected areas.

The activities to enforce the protected area tenure and establish formalize co-management governance structures includes:

- Clarification of protected area boundaries and, where necessary, facilitation of zoning/re-zoning in collaboration with stakeholders;
- Formation of functional democratically-elected Community Associations with formalized governance through theirr bi-laws and constitutions;
- Facilitation of the transfer of rights and access to natural resources in protected areas, including, where appropriate, revenue sharing in the protected areas from the DNPW to local communities through co-management agreements; and
- Facilitation, development and execution of REDD+ agreements between the DNPW and Community Associations to define roles and responsibilities under the REDD+ program, carbon tenure and financial and operational governance arrangements.

Figure 18. Newly elected Executive Committee and Officers of the Nkhotakota Wildlife Reserve Association, at a carbon development training in Nkhotakota (September 2013)

1.3.2.2 Support for the Development and Implementation of Sustainable Forest and Land-Use Management Plans

Building on strengthened tenure and protected area governance in place, the Project supports the development of co-management plans that define allowable land uses inside the protected areas. The co-management plans signed between the DNPW and the Community Associations to:

- Obligate the Association members, employees of the Association and the members of the public in general to comply with the National Parks and Wildlife Act (2004), as amended, pertinent laws of Malawi, as well as terms of the co-managemetn agreement, and with approved Nyika National Park and Vwaza Marsh Wildlife Reserve Management Plans;
- In the event that the Association is unable to ensure compliance, the Association shall inform the appropriate government agency in writing (the DNPW, Malawi Police etc), which shall take action to ensure compliance; and
- Renew co-management agreements to enable communities to share benefits from park entrances and concession fees.
- It further obligated the DNPW to:
- Build capacity in relevant fields in the Association; and
- Facilitate wildlife-based and other income generating activities for the Association.

At the village level, forest management plans are created and submitted to the District Commissioner. In these plans the village-level rules are adopted by the community and the allowable land and forest uses are included the in the village by-laws. The plans prescribe penalties for not following the agreed land and forest use. When the village-level forest management plan is signed off by the District Dommissioner, the Chiefs have the formal support necessary to impose penalties

1.3.2.3 Forest Protection through Patrolling, Social Fencing and Maintenance of Forest Boundaries

The capacity of law enforcement authorities is too limited to defend the boundaries of each of the protected areas. Therefore the Project will provide training and capacity building for communities to engage in participatory forest protection. Once these institutional structures are established and adequate training has been delivered, DPMW and the Community Associations will be able to oversee and enforce community-based co-management of the protected area. This approach to improved governance aims to stimulate forest stewardship through "social fencing"[4] of forest resources that are co-managed by local communities (Henkemans 2000).

The activities that mobilize community-based NRM in the protected areas through increased awareness and capacity include:

- Recruiting and training community workers to support Community Associations in law enforcement, training and other needs;
- Providing training for protected area and Community Association officials in NRM institutions in corporate governance, team building, fund raising, project write-ups, resource assessments/problem analysis, basic NR rights and conflict resolution;
- Providing training for protected area and Community Association officials in community mobilization, participatory law enforcement, etc.;
- Providing logistical support to protected area officials to improve communications and mobility with GPS and radio units;
- Supporting the communities to access better facilities for communications through providing motor bikes and bicycles;
- Providing support for the establishment of village umbrella committees and providing training community development of NRM activities; and
- Conducting awareness campaigns through training of primary school teachers in environmental education, facilitation of the establishment of youth conservation clubs, protected area visits for youth clubs, initiation of the development of environmental education curricula development for primary schools and adults.

1.3.2.4 Fire Prevention and Suppression Activities

The DNPW will develop jointly with the Associations a fire management plan, and implement fire management activities within the protected areas, including: installation of fire breaks, instituting early warning systems (e.g., use of mobile phones), clearing the forest of dead wood, discouraging fire for hunting, and warding off revenge-based fires. The Project will implement a fire control and management plan campaign to increase understanding and awareness of the program.

Activities aimed at preventing and suppressing bush fires include:

- Training and education within the conservation agriculture component on fire reduction;
- The DNPW developing a fire management plan in collaboration with the Community Associations;
- Implementing fire management activities inside the protected areas, including controlled burns, fire breaks, weed control, and fire management based on sound ecological principles; and
- Implementing a fire control and management communication campaign to increase awareness.

The local leaders are taking up the responsible and 1) at the village level, rules will be adopted by the community and included the in the village bi-laws that prescribe penalties for setting fires and 2) when the village-level forest management plan, which includes penalties for cutting and fires, is signed off by the District Commissioners, Chiefs obtain formal support to impose penalties.

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[4] the protection of forests from external threats through organization and social control

1.3.2.5 Reducing Fuelwood Consumption and Increasing Energy Efficiency by Introducing Fuel Efficient Cookstoves

Figure 19. Dorothy Kondowe from Rumphi in her kitchen with household members on 6th March 2013, using Improved Brick Cookstove

TLC has been promoting fuel-efficient cookstoves across the Project Zones for over 5 years (2004-2009) and has selected a particular design that is efficient, low-cost and uses readily available locally-sourced materials. There are two type of stoves, mud stoves and improved brick stoves, and can be built in a convenient fireplace within traditional kitchens. The current design of the mud stoves has an energy efficiency of 16%, which the improved brick stoves have energy efficiency of 20%, with maximum results obtaining being 26% thermal efficiency.

The ultimate goal is to improve the design to reduce wood use and/or increase efficiency by 50%. In this regard, TLC has been working with cookstove designers to produce more efficient, low-cost, "Improved Brick Cookstoves" for rural households, with efficiency ranging from

50-70% (*pers comm. Blesings Mwale October 28th 2013*).

Activities to promote reduced fuelwood consumption and increased energy efficiency include:

- Training of trainers on construction of cookstoves; and
- Introduce improved kitchen stoves to reduce firewood consumption and impacts of deforestation in communities surrounding NV and NKK, including through community sensitization meetings.
- Distribution of approximately 3,000 cookstoves per quarter for crediting period of the Project.

The Project includes the distribution of cookstove to reduce fuel-wood and reduce indoor smoke pollution. The stoves are constructed directly opposite the door and adopted rates are tracked as part of the quarterly Project monitoring. The Projects' goal is to achieve 30,000 households using cookstoves. Once fully operationally the program can distribute approximately 3,000 stoves per quarter; thus, the Project expects to reach full distribution capacity by year 3. This would mean that 30,000 stoves would be adopted by year 6.

1.3.2.6 Creating Alternative Sources of Fuelwood through Agroforestry, Farm Woodlots Management

This set of activities focuses on creating an alternative source of fuelwood through agroforestry interventions, such as interplanting trees with crops that increase yields (e.g. *Faidherbia albida*) and the provision of fuelwood to local farmers.

In addition, under the Project, woodlots will be planted in communal village areas to produce fuelwood. Similarly, the management of existing woodlands will be improved through workshops and capacity building sessions. The effects on the protected forest areas from a reduction in fuelwood collection due to the existence of woodlots and woodlands is accounted for in the Project.

Activities to create alternative sources of fuelwood include the following:

- Community sensitization and training on nursery creation and management, and outplanting;
- Village-level nurseries established and maintained in communities surrounding NV and NKK;
- Outplanting of seedlings; and
- Natural woodlots under community management.

Figure 20. Mr Jonas Kagona' Natural tree regeneration woodlot in Kasungu , Enfeni EPA, (left) and individual planted woodlot (right) in Muhuju, Rumphi being appreciated by a USAID Stock Taking Mission

1.3.2.7 Sustainable Intensification of Agriculture on Existing Agricultural Land

Figure 21. A farmer using conservation agriculture with rotation of maize and groundnuts, Mpumo Village, Nkhotakota District. (Photo: April 2013.)

Agricultural intensification activities are essential to improving productivity of agricultural lands and increasing the yields of crops supported by those lands. Distributing higher-yield varieties of crops grown locally, such as cassava, results in faster maturation times over traditional varieties. Improving irrigation access and efficiency promotes more productive irrigation seasons that support a higher diversity of crops, with as many as three crops supported per year. Resulting improved water efficiency and residual soil moisture due to irrigation interventions also improves agricultural yields, while the distribution of pumps reduces the opportunity costs associated with other methods of water collection. Conservation agriculture techniques also improve the viability and yield of vegetable crops, as well as improve residual soil moisture and nutrient content. The Project will promote an increase in productivity and agricultural yields on existing agricultural lands through the following activities:

- Community sensitization meetings focused on the use and installation of treadle pumps and other irrigation methods to produce vegetables;
- The distribution of higher-yielding, improved cassava bundles to improve agricultural productivity; and
- Encouraging the adoption of conservation agriculture techniques, including the use of herbicides, weed reduction, and the enhancement of soils.

1.3.2.8 Development of Local Enterprises based on Ecotourism and Sustainably Harvested NTFPs (coffee, honey, macadamia, livestock)

The development of rural enterprise through the promotion of ecotourism activities and the production, processing and marketing of sustainably produced non-timber forest products is critical to transforming livelihoods away from subsistence and improving rural livelihoods through increased self-sufficiency. The NTFPs being most heavily promoted include honey, coffee, and macadamia. Small livestock husbandry is also an important skill for diversifying and increasing protein sources available in communities while reducing hunting pressure and encroachment on protected areas.

Activities to support the development of local enterprise based on ecotourism and sustainably harvested NTFPs include:

- Promote the development of new eco-tourism sites and projects;
- Collaborate with Wilderness Safaris to organize ecotourism activities in and around protected areas;
- Provide training to local communities, including community sensitization meetings, on the construction and management of beehives for honey production;
- Purchase and distribute apiary equipment to households in the Project Areas;
- Identify markets for the sale of local honey produced from NRMAs, and facilitate the distribution and sale of honey;
- Conduct community sensitization meetings in agriculturally appropriate areas on the benefits of coffee production and macadamia production;

Figure 22. Kulera Project Coffee intervention in Ntchisi Area. Mr John Kanyangala of Ng'ombe Village, Ntchisi with his 2000 + coffee seedlings ready for transplanting

- Conduct extension work with farmers in order to teach them how to produce and maintain seedling outplants and maintain coffee plants and macadamia trees;
- Assist smallholder farmers in finding markets for their products;
- Provide training through extension services in animal husbandry and animal health;
- Create acceptable confinement areas for animals; and
- Create village-level plans for redistribution of small livestock within the community.

1.3.3 Map Identifying the Project Location and Boundaries of the Project Area(s)
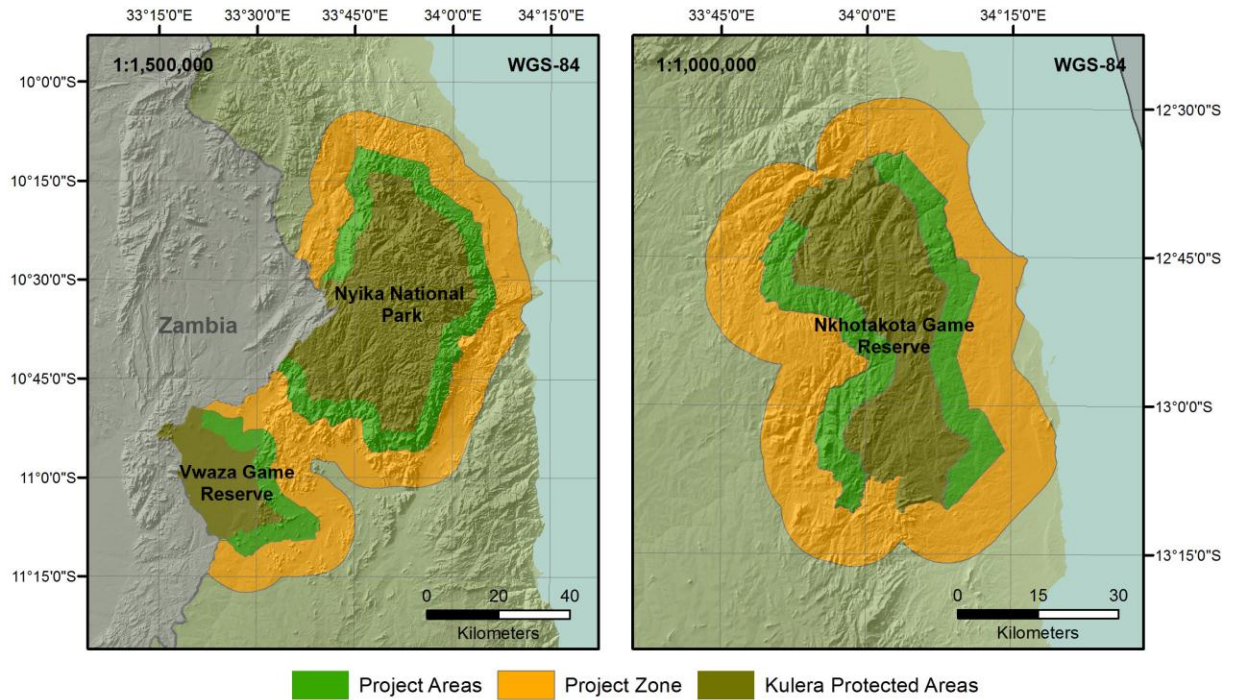
Figure 23. Overview of the Extent and Location of the Leakage Belt, Reference Region, and Project Areas.

1.3.4 Definition of the Project Lifetime and GHG Accounting Period

The Project began in 2009, with the inception of the Kulera Biodiversity Project, and after many years of community work by TLC including a preparatory period that included community consultations, training and discussions with the DNPW and other stakeholders.

In the first four years of the Project, the focus has been on working with communities to strengthen land tenure through the formation of a democratically elected Association for the communities surrounding the Nkhotakota Wildlife Reserve (i.e. NAWIRA); facilitating the development and execution of a REDD+ agreement between the DNPW and the Associations; providing training to Community Association officials to facilitate their participation in the REDD+ program; distributing cookstoves to households in the Project Zones (i.e. 6,611 out of a potential 39,000 cookstoves have been distributed); planting a total of 14 million trees in community woodlots; promoting increased agricultural productivity and higher yields on existing agricultural lands; providing training and assistance in livelihood programs such as honey, coffee and, macadamia production, and small livestock support (see Section 1.3.2 for a complete description of Project activities).

The VCS Project **crediting period is 30 years**, starting October 1st 2009 and ending September 30th 2039. The Project lifetime and implementation of the Project activity is at least 30 years and the Project benefits are expected to last far beyond this timeframe. For example, the benefits to threatened and endangered species of habitat protection and to communities of strengthened land tenure will continue. Additionally, the VCS Project longevity period is 60 years, ending in 2069. This is the period for which the Project proponents are committed to maintain activities that will protect previously issued credits. Examples of activities that will be maintained during the longevity period include forest protection through patrolling and the continuation of local enterprises.

1.3.5 Likely Natural and Human-Induced Risks to the Expected Climate, Community and Biodiversity Benefits

The Project faces a number of potential risks to the expected climate, community and biodiversity benefits. The following outline, while not exhaustive, represents the most likely anticipated risks. The Project team has prepared an overall risk rating for the Project, using the VCS AFOLU Non-Permanence Risk Tool (VCS Version 3). This assessment can be provided to the Validators.

1.3.5.1 Human-induced Risks

1.3.5.1.1 Community Adoption Risk

In any REDD+ Project, there is a risk that the communities will not adopt the practices necessary to reduce deforestation in the Project Areas and that the drivers of deforestation will continue throughout the crediting period of the Project (Section 1.2.1). This risk has been mitigated through an extensive community engagement process throughout the Project. For example, during the first four years, TLC and extension workers conducted a variety of community consultation activities aimed at training, information sharing, and learn-by-doing on topics related to the Project activities. Topics of focus for these consultations included but were not limited to: agricultural extension and training, monitoring and evaluation, nurseries and tree planting, improved cookstoves, crop diversification, irrigation, enterprise development, and business skills and marketing. In addition, Community Association officials have engaged with village-level natural resource management committees, who have committed to ensuring implementation of co-management agreements. Community Associations are also committed to maintaining agreements with community members to ensure that communities have given informed consent and support the Project.

1.3.5.1.2 Government Approval Risk

There is a risk that the government will not provide the necessary approvals to support the co-management of the Project Areas and Project Zones and/or that that the government will not complete necessary agreements required to support the implementing partners with technical support for the emission reduction registration, issuance, sales and funds distribution. Terra Global has mitigated this risk by working closely with TLC to identify the government entity that can provide the necessary approvals, early in the Project, and to complete the execution of the key agreements. Terra has signed a REDD+ Agreement with the DNPW and NVA that defines the roles and responsibilities under Project including: carbon tenure, on-going technical support and financial and operational governance arrangements. Terra will further mitigate this risk by signing a similar agreement with the DNPW and NAWIRA, and getting any necessary modifications to existing co-management and management agreements that formally recognize the parties' roles in co-management of the protected areas and on-going involvement of the Project actions and the benefits sharing.

1.3.5.1.3 Enforcement Capacity in Protected Areas

Malawi is a Heavily Indebted Poor Country (HIPC) and, with limited resources for enforcement, lacks the means to enforce laws related to natural resources. The DNPW employees are unable to fully protect the areas for which they are assigned. Specifically, each park ranger is responsible for patrolling 20 km²;

though, admittedly, three times more rangers are needed to protect the same area. The patrol camps lack adequate infrastructure, are spread too far apart, and there are not enough camps within the parks. Park rangers have access to one vehicle per protected area, which discourages transportation to more remote regions of protected areas, as well as communication among park rangers. Park rangers are sometimes less equipped and outnumbered by poachers and illegal loggers. Although poaching and illegal

Figure 24. Training of park rangers, who are understaffed and lack infrastructure

logging operations are reported by park rangers, these events usually are tolerated by rangers. Park rangers are also paid a low wage. The Project proponents have mitigated this risk through a series of Project activities designed to further mobilize communities and increase the capacity of park officials in protection and enforcement of park boundaries. These activities include, for example, providing training to Community Associations in participatory law enforcement and providing logistical support to protected areas officials to improve communications and mobility, among others (see Section 1.3.2.3).

1.3.5.1.4 Policy Effectiveness

On paper, once co-management plans are approved, local communities have the rights to share in the benefits of conservation and natural resource-based enterprises. However, the above overview of policies and institutions raises several questions regarding the effectiveness of decentralization policies, and suggests challenges that may need to be considered in the development of these projects:

- Although hereditary, the Chiefs are often appointed by the government from among those eligible, and their salaries are paid by the government. At the village level, formally, TAs have only a custodial role. In addition, there is increasing reliance on the authority of District Commissioners and Resident Magistrate courts rather than traditional authorities to resolve disputes. However, it also has been noted that village forest management committees not rooted in clan authority tend to fail, and they are regarded as critical for mobilizing the communities.
- At the local level, there is a proliferation of committees–it is not clear if they are competing for authority or operating in parallel. For example, the recent Customary Land Bill, 2012 established new customary land committees, chaired by the Group Village Head (GVH), and provided these committees a number of new powers including the right to determine the portion of customary land that will be set aside as communal land and for what purpose (Malawi Law Society 2012). Traditional Chiefs have publicly challenged the law stating that having GVHs head the land committees will result in a power conflict between them and the Chiefs (Nkawihe 2013).
- The District Assembly has Village and Area Development Committees to engage local communities. At the area level, they cover all villages under a particular chief, whose role is primarily one of community mobilization. At the local level, there are also Village Natural Resource Management Committees, Block Management Groups for communities adjacent to state forest reserves, Village Beach Committees, and multi-stakeholder forest management boards.
- There is a significant difference between policies and practice. Although the country has strong forestry policies that aim to benefit communities, it is clear that implementation is a work in progress and although a number of village natural resource management committees (VNMRCs) have been formed, actual forest management plans have yet to be approved. An additional noteworthy example of the gap between policy and practice is charcoal production which is a USD41 million a year industry, and is the major national source of energy. However, as of 1997, the entire production is essentially illegal: While it requires a permit and must be done consistent with an approved forest management plan or agreement, so far no plans have been approved and no licenses have yet been issued (FGLG 2008).

The Project is mitigating these risks by providing clarity on decentralized governance structures for protected areas management, through strengthening co-management agreements between the DNPW and Community Associations. In addition, through the REDD+ agreements between the DNPW and Community Associations the roles and responsibilities of Association members (i.e. the communities) in natural resource management has been clarified.

1.3.5.2 Natural Risks

The most serious natural risks in the Project Areas and Project Zones have been fire, dry spells and seasonal droughts and to a lesser extent, intense rainfall, riverine floods, flash floods and earthquakes. Some of these, especially droughts and floods, have increased in frequency, intensity and magnitude over the last two decades, and have adversely impacted on food and water security, water quality, energy and the sustainable livelihoods of rural communities

1.3.5.2.1 Fire

Between 1990 and 2005, the average area burned per year was 682 ha, with an average number of fire events of 56 per year. Wildfires have also been reported as occurring in softwood plantations during prolonged dry periods. However, not all wildfires are reported to have completely damaged the existing trees. A general trend of increasing mean annual temperatures and a decline in mean annual rainfall has been observed in Malawi, which can be attributed to forest loss potentially due to wildfire; a decline in the availability of non-timber forest products; reductions in agricultural crop yields; and declining potable water supplies and the associated risk of water-borne diseases (Foli and Makungwa 2011). In the Lake Chilwa area of Malawi, in addition to declining potable water supply and drought is associated disease risks, there has also been poor productivity on tree farms; loss of indigenous trees in communal areas, riverbanks and surrounding forest reserves; a decline in agricultural productivity; and declining fish catch from the lake. Malawi has had two major droughts over the past 50 years (1948-49 and 1991-92). Severe drought in Malawi has a return interval of 25 years i.e., 1 severe drought event every 25 years. Forest fire related studies are limited to softwood plantation (FAO 2010). Because of limited information on forest fire, the severe drought frequency was used as a surrogate correlated variable to for fire frequency. Therefore, a fire return interval of 25 years was used coinciding with the drought frequency.

The Project proponents are aware of the potential fire risks in the Project Areas. Therefore, fire prevention activities are in place (i.e., fire breaks). The local forestry professionals are trained for fire prevention measures. Malawi is member organization of SAFNet - a network with membership drawn from National Parks, Government Forest fire sectors, regional NGOs, independent consultants, University and Research bodies within the Southern Africa countries. The network membership has a wide representation of the fire community in the region and diverse fire skills. This network facilitates increased participation by national fire management organizations in fire issues. This network maintains a strong international link through GTOS/GOFC and this provides exposure to existing international data archives, new technologies and external expertise in fire issues. Further, SAFNet has a strong research capacity which is fundamental to establishment of a solid foundation for long-term capacity building in Southern African fire issues. Additionally, the fire control equipments and tools will be kept and maintained by the Project proponents.

The forest floor in the Project Areas contains minimal amount of fuel load, thus minimizing the damage from fire. The Project proponents have has a responsibility and experience in implementing effective fire prevention measures and has gained substantial experience in dealing with forest fire. Our assessment concluded that forest fire may occur due to drought in the Project Areas. Since no evidence of huge forest loss due to fire in the natural forests is known to have occurred in the Project Areas, and given that the small area i.e., 682 ha per year has actually burnt in the entire country, the loss occurring from forest fire was assumed to be small to moderate with return interval of 25 years. Again, the fire management capacity and history of qualified fire management experience of the Project proponent, fire mitigation points were applied in risk buffer determination.

1.3.5.2.2 Extreme Weather

According to the EM-DAT International Disaster Database, the most prevalent types of disaster in Malawi, in terms of the numbers of people affected, are droughts and floods, which are linked to erratic rainfall and have often been linked to famines (Menon 2007). Virtually the whole of Malawi is vulnerable to droughts. Even in the absence of pronounced droughts, intermittent long dry spells within the rainfall season are a common occurrence in many parts of the country. The frequent occurrence of drought has been a concern and this may result in instigating fire should the forest be full of fuels (see fire risk section above).Six drought events are reported for the period 1900 to 2010, which affected close to 20 million people. However it is important to note that these have all occurred since 1988, and that the database only records events for which there has been a declaration of a state of emergency, and for which there was a call for international assistance, as well as a minimum number of people killed or affected. Therefore it is more likely that the recent occurrences reflect changes in policy and in reporting rather than actual occurrences of extreme events. Floods are the second most prevalent type of disaster and are more frequent but are localized and affect fewer people – just over 1.5 million have been reported as affected during the same period, for 27 events reported, of which over half (15) were reported in the last decade, and all of which have occurred since 1960. Droughts and floods are exceeded only by epidemics

in terms of the numbers of reported deaths, and by an earthquake event in terms of damage costs (Table 9).

Table 9. Summary of Natural disasters in Malawi from 1900 to 2010

Type of event	Number of events	Casualties	Total affected area [ha]	Damage (1000 USD)
Drought	6	500	19,678,702	-
Earthquake	3	13	3,279,783	28,000
Epidemic				
Unspecified	2	175	-	-
Bacterial infectious disease	10	1433	51,549	-
Flood				
Unspecified	12	22	409,890	1,700
Flash Flood	4	481	339,246	24,000
General Flood	9	11	658,099	89
Storm surge/coastal flood	2	67	518,500	6,700
Storm	1	11	8	-

Source: EM-DAT: The OFDA/CRED International Disaster Database (Created on: May-25-2010. - Data version: v12.07) www.em-dat.net - Université Catholique de Louvain - Brussels – Belgium

Although Malawi, in general has risk of flood (World Health Organization 2010), the Project Areas are situated in flood free area. There are four river basin systems in Malawi that experience severe floods regularly: the Ruo/Shire, Likangala/Thondwe, Limphasa/ Luweya and the Songwe. The Project Areas, however, do not lie in flood zone (Figure 25. Flood Hazard Map).The natural ecosystem in the Project Areas is adapted to handle seasonal weather pattern. No devastating weather event has occurred in recent history in the Project Areas (except for the two droughts during the past 50 years). Therefore, no risk of loss from extreme weather was assumed in estimating the risk score for the VCS.
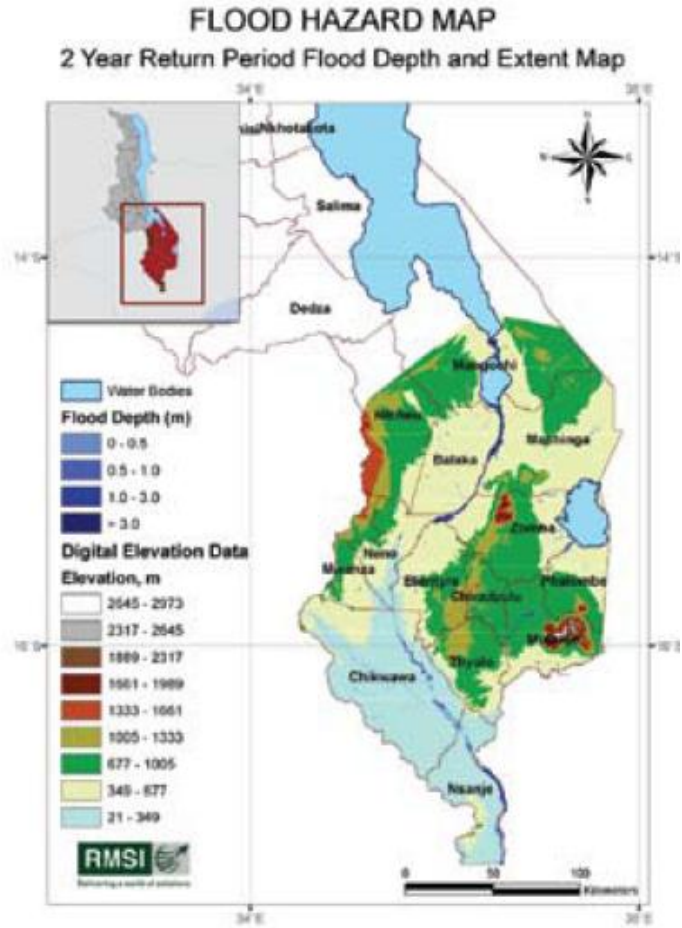
Figure 25. Flood Hazard Map

1.3.5.2.3 Geological Risk

The Project Areas are situated in the region subject to minimal risk of loss arising from earthquakes. The risk of loss of trees from the earthquakes is low given the low strength of expected earthquakes (i.e. less than or equal to Class VI according in modified Mercalli scale classes) (**Error! Reference source not found.**). The Project Areas have not observed any seismic activity recently. The Global Seismic Hazard Assessment Program (GSHAP) of the International Lithosphere Program (ILP), the International Council of Scientific Unions (ICSU), which was endorsed as a demonstration program in the framework of the United Nations has put Malawi into low risk countries (Figure 27). The 1989 Malawi earthquake, a magnitude 6.6 quake, occurred on March 10, 1989 in central Malawi. No reported loss on forest cover has been found linking the loss to earthquake events. The volcanic activity in the vicinity of Project Areas is non-existent and there is not active volcano in the region. The Project Areas are far from active volcanic activity i.e. Nyiragongo and Nyamuragira volcano of DRC are only active volcanoes in the region and are far away from the Project Areas to pose any threat to the Project Areas. Additionally, the World Bank's disaster review did not identify earth quake as major risk form natural disaster (World Bank 2011). Therefore, risk of loss from geologic factors was assumed to be 0 in the VCS Risk Buffer.
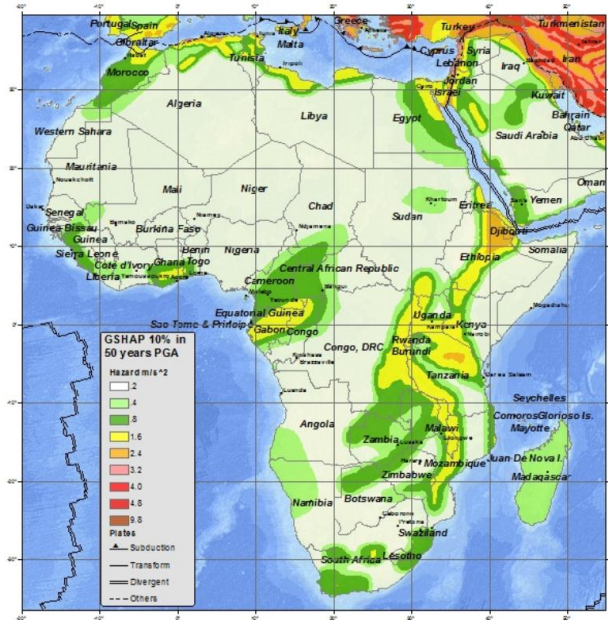
Figure 26. Siesmic Hazard Map for Africa (Source: USGS 2012)

Figure 27. Global Seismic Hazard Map (Source: GSHAP 1999)
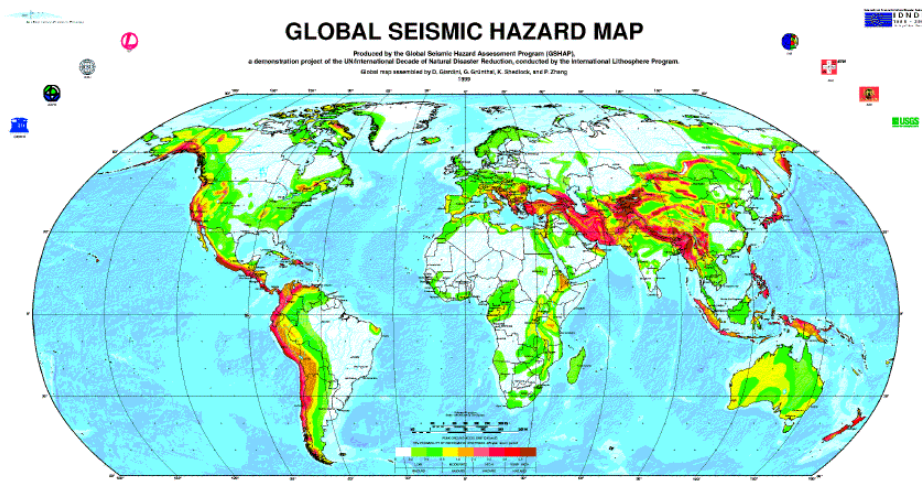
1.3.6 Measures to Ensure Maintenance or Enhancement of High Conservation Value Attributes

The Project seeks to ensure the maintenance of HCV areas by supporting communities in a number of ways that decrease pressure on existing resources. These measures include strengthening land tenure and forest governance, and supporting community livelihood programs through various measures that are being financed through the sale of emission reductions. Also, key will be to provide training and capacity building so that communities are able to carry out protection activities including enforcement, community engagement and sensitization. This will be done using the existing structure such as the Village Natural Resource Management Committee (VNRMC) and improving their capacity to deliver law enforcement, monitor key natural resources, and establish co-management plans and agreements with the DNPW such that those resources that are allowed to be harvested from the protected areas are done so in a sustainable manner. The trainings shall also ensure that the rights of access and use of resources by community-based user groups are clearly understood and applied as well as provide new opportunities to increase awareness about conservation among children and youth.

1.3.7 Measures that Will Be Taken to Maintain and Enhance Benefits Beyond Project Lifetime

Several of the planned Project activities permanently enhance and support the incomes of Project households. For example, there are long-term contractual agreements (i.e. the co-management agreements) in place between the DNPW and the Community Associations that will be strengthened and renewed on an on-going basis beyond the Project's lifetime. In addition, the Project is designed to become self-sustaining over the long-term by developing local enterprises, such as honey, coffee and macadamia and small livestock for breeding, and attracting ecotourists to the Project Areas (see Section 1.3.2.8 for a complete description of enterprise development activities).

Deforestation mitigation activities, such patrolling, social fencing and maintenance of forest boundaries, will also continue beyond the lifetime of the Project as many of these activities do not rely entirely on revenue from the sale of emission reductions. For example, the projects will provide training and capacity building, within the lifetime of the Project that will be valuable beyond the life of the Project. Community will be able to engage in participatory forest protection (e.g. "social fencing"). Once these institutional structures are in place and strengthened Community Associations will be able to oversee and enforce co-management of the protected areas and stimulate sustainable forest stewardship over forest resources.

Further, the Project will train rural communities to undertake activities that promote self-reliance, build resilience, improve food security and open up new opportunities for wealth creation. Some of these interventions include conservation agriculture, creating alternative sources of fuelwood through agroforestry and farm woodlots, and reducing fuelwood consumption through introduction of fuel efficient cookstoves.

1.3.8 Identification and Involvement of Communities and Other Stakeholders in Project Design

The Project is targeting a total more than 45,000 households in the Project Zones. This number of households represents a total population of 225,000 people who are living in rural communities in the border zone of the targeted protected areas (see Section 1.1.3).

TLC's proposal to USAID for the Kulera Biodiversity Project was developed through a highly collaborative process, involving senior technical staff from all TLC Team Partners. This process included extensive consultations with officials from all relevant GOM Ministries and Departments to incorporate their respective visions into our approach and to ensure alignment with key national and international policies and strategies. Consultations also involved leaders of community-based organizations around protected areas and local private sector firms to better understand the challenges and opportunities from their perspective. Assessments of development initiatives in Malawi and elsewhere were undertaken to document key accomplishments, successes, and lessons as a foundation for the Project's strategic focus.

During the first four years, the Project conducted a variety of community consultation activities aimed at training, information sharing, and learn-by-doing on topics related to the Project activities. These community consultations included staff training, community sensitization meetings, community training and demonstrations, field days, and field tours. Topics of focus for these consultations included but were not limited to: agricultural extension and training, monitoring and evaluation, nurseries and tree planting, improved cookstoves, crop diversification, irrigation, enterprise development, and business skills and marketing.

Table 10 represents a partial listing of community consultation activities that have taken place through March 2013 across the Rumphi, Kasungu, and Nkhotakota zones:

Table 10. Community Consultations through March 2013

Period	Community consultation type				
	Staff training	Community sensitization meetings	Community training/demonstrations	Field days	Field tours
Year 1 (November 2009 - September 2010)	Initial Project implementation took six months; no notable community consultation progress in Year 1				
Year 2 (October 2010 - September 2011)	119	2291	872	20	7
Year 3 (October 2011 - September 2012)	39	4296	1751	113	28
Year 4 (October 2012 - September 2013)*	53	1176	909	70	0
Total (through March 2013)	211	7763	3532	203	35

Data on community consultations not available after March 2013 at the time of this report

1.3.8.1 Partnerships and Collaboration

Project activities will be sustained from the extensive network of linkages established with Government Departments, local and international NGOs, the Private Sector, and long term donor-funded projects. Support services rendered will provide collaborating institutions and organizations with the training, resources and capacity to continue their programs independently of the Project. The knowledge and skills gained by these communities and organizations are lasting results that cannot be changed, lost or destroyed. The outputs will remain for the collective use by all concerned. A sample of results is listed below:

- Increased institutional capacity of partners, Government, District Assemblies, CBOs and other stakeholders to sustain, improve and replicate the models and intervention developed (from intensive multi-disciplinary training, technical support and hands-on-experience).
- Development of participatory governance models for biodiversity with documented strengths, weaknesses and opportunities to provide a basis for improvement.
- Analysis of interventions to generate a knowledge-base of what works where and why.
- Documentation of successes, lessons and best practices with a user-friendly database to help in decision-making and problem solving for future use and reference.
- Development of methodologies for carbon trading based on changes in land use and REDD+ to provide economic incentives to intensify efforts to promote biodiversity and CBNRM.
- Development of M&E systems to monitor and understand changes in biodiversity landscapes in the context of livelihoods and ecosystem dynamics, with assessments of impacts over time and underlying causes.
- Development of up-to-date extension and training manuals based on proven practices.
- Increased self-sufficiency in the supply of quality inputs and seeds.
- A sound policy and legal framework to better guide development initiatives.
- A network of lasting linkages with the public and private sectors to improve and sustain collaboration for broader and more effective impacts based on instituted policy frameworks.

1.3.8.2 Establishment and Capacity of Community Based Groups

In the first four years of the Project, TLC has supported communities surrounding the Nkhotakota Wildlife Reserve to organize under an umbrella organization, NAWIRA, for the protected area to oversee all technical, financial, organizational interests. As the groups matured into a self-sustaining entity it is undergoing registration with the Registrar General. This body, like NVA, will have the powers and responsibilities to manage the affairs of its members with minimum support or interference from outside. In addition, through the training they will receive through this Project, they will gain the confidence in consolidating and scaling up the technologies promoted under these actions.

Along with NVA, NAWIRA will be trained in leadership, group dynamics, finance and business administration, business management, marketing and product development. TLC has extensive experience in forming associations, and has collaborated with the DNPW Ministry of Agriculture and Food security, WESM, NASFAM, Farmers' Union of Malawi and others to use their expertise to institute strong community ownership of the proposed activities.

TLC and its partners are also building the capacity of existing groupings already operating in the areas such the NVA. .

1.3.8.3   Community Extension Workers

In addition to Project staff, the Project will engage and train village extension agents/volunteers who reside within the target villages to participate in extension and training activities. These agents will be provided with basic tools, skills and resources to help deliver services to the community in which they live. The intention to transfer full responsibility to these agents for delivering extension services to their villages. TLC is currently using 42 village extension agents under this approach across various projects.

1.3.8.4   Collaborative Agreements

In the first four years of the Project, extensive input was received from the leaders of NVA and NAWIRA, which represent the communities, in the development of REDD+ agreements between the DNPW and the Associations that define the roles and responsibilities of each of the parties, carbon tenure and financial and operational governance arrangements. Extensive input was also received and incorporated into the designs of the Project workplans and budgets that define community benefits over the lifetime of the Project.

1.3.9   Steps and Communications Methods to Publicize the CCBA Public Comment Period to Communities and Other Stakeholders

Parallel to the publishing of the English-language PD on the website of the CCB and the mechanism on the CCB website (http://www.climate-standards.org) to provide public comments, a number of activities are organized to provide local communities and stakeholders the opportunity to provide public comments. This document has been distributed within the DNPW and will be distributed to local government officials, at the district, province, and national level, as well as to local NGOs in the regions where the Project Areas are located.

Additionally, TLC will organize consultative meetings with the Executive Committees of the two Associations, who represent the communities at large. The Community Associations along with TLC Zone Managers will hold a series of briefings in order to get final input from the communities and other stakeholders into the PD.

All comments will be centralized by one person within TLC, and translated into English, and sent to TGC before the end of the public comment period. TGC will then submit the comments from local communities and other stakeholders to the CCB.

1.3.10   Process for Handling Unresolved Conflicts and Grievances that Arise During Project Planning and Implementation.

The Project relies on existing and emerging institutions to mediate any conflict arising from Project related activities. In the first four years of the Project TLC worked with existing community structures and farmer groups. If these groups did not exist, new ones were formed. The groups were organized around a particular common interest e.g. conservation agriculture, natural resources management, or small-scale irrigation. . For existing groups, TLC further developed capacity in the relevant technical area as well the functional aspects of the group (e.g. group dynamics and leadership). Refresher courses were provided by field staff.

For the Project, training and capacity development will also include aspects of conflict resolution. Conflicts will be managed and resolved at the local level using a hierarchical structure:

1.   The Committee normally will handle any issues at their level;

2. If the Committee fails to resolve the issue, the matter would be taken to the Village Head;

3. If the Village Head cannot resolve the issue, the matter would be taken to the Senior Village Head (highest level is the Traditional Authority);

4. If Traditional Authority cannot resolve the issue, the matter is referred to the District Commissioner, All Chiefs are under the Ministry of Local Government, the highest representative at District level is District Commissioner. However, to reach this level, the matter would be very serious.

When a new group is formed, training is provided that includes choosing the right leadership, including the qualities of leadership that are necessary, as well as conflict resolution. The involvement of local leaders as central to extension practices, from the Project start, is critical as they are able to anticipate and resolve many issues before they become a conflict. Furthermore, the Associations will be the focal point in the community for preparing annual workplans and ensuring a transparent and participatory process among their members. Since the Associations have close interaction with the local commune government and the DNPW staff, this process allows a consensus plan to emerge that will minimize the chance for conflict. Conflicts that may arise during the course of Project implementation will be presented and vetted during regular (monthly) Association meetings. Conflicts that cannot be resolved at the level of the Association will be mediated by a mutually agreed upon, neutral third party, as stated in the Carbon Agreement signed by the NVA, NAWIRA, the DNPW and Terra. TLC and the DNPW will attempt to resolve conflicts that are based on the Forestry Laws and the co-management agreements, and will provide a written response to grievances within 30 days (by the next monthly meeting). Project conflicts and their associated responses will be documented.

1.3.11 Demonstrate that Financial Mechanisms Provide an Adequate Flow of Funds for Project Implementation

Project implementation budgets for the 30 years of the Project life plus 30 more years for maintaining carbon stocks from previously issued credits have been developed for the Project covering all the Project activities. In addition, all of the costs associated with developing and validating under the CCB ad VCS as well as the costs of on-going monitoring and dual verification have been estimated. These are combined with the projected revenue from the Project to provide the annual cash flow estimated from the project. These estimates demonstrate that there is adequate cash flow for the Project, these confidential financial projections and will be made available to the validator as part of the audit.

1.4 Management Capacity and Best Practices

1.4.1 Identification and Roles of Project Proponents

The Project proponents for the Project are: the Department of National Parks and Wildlife (DNPW), on behalf of the Government of Malawi; the Nyika-Vwaza Association (NVA); the Nkhotakota Wildlife Reserve Association (NAWIRA); and Terra Global Capital (TGC). They will be assisted by implementing partner Total LandCare (TLC) and receive legal support from Sacranie, Gow & Company. The specific roles of each of the Project proponents are outlined below.

Roles and Responsibilities of Project Proponents

- **The DNPW** have agreed to transfer carbon rights into a Public Private Partnership Entity that will act as the seller of carbon on behalf of the Government of Malawi. The DNPW is responsible for a number of Project actions in the workplan including establishing and implementing a monitoring system for carbon accounting, biodiversity and livelihood generation; renewing and revising co-management agreements with Community Associations as needed to generate and maintain emission reductions for the crediting period of the Project; forest protection through patrolling, maintenance of forest boundaries, and fire control; and promoting the development of eco-tourism in and around the protected areas. The DNPW will also recognize TLC as the implementing partner for the Project.

- **Community Associations (NVA and NAWIRA)** have agreed to transfer carbon rights into a Public Private Partnership Entity that will act as the seller of carbon on behalf of the communities. The Associations are responsible for a number of Project actions in workplan including: strengthening and maintaining co-management agreements with the DNPW; controlling deforestation through social fencing, community sensitization and fire control and management; creating alternative sources of fuelwood through agroforestry and farm woodlots; and implementing a number of livelihood programs with communities including ecotourism, honey, coffee, macadamia, and small livestock. The Community Associations will also maintain agreements with community members to ensure that communities have given informed consent and support the Project.
- **Terra Global Capital's role** includes; i) conducting all carbon development work under the VCS and CCB standards for PD development and carbon calculations, ii) support for on-going monitoring and the development of the VCS and CCB monitoring reports, iii) management of the validation and verification process, iv) training for community-based participatory filed data collection, v) establishment of the institutional arrangements for REDD+ legal, operational and financial management, vi) development of web-based monitoring tools, vii) marketing and transaction structuring for emission reductions and, viii) acting as the general manager for the REDD+ entity for the initial years until local capacity of built.

1.4.2   Identification of Key Skills and Experience of Management Team

The implementing partners have extensive experience designing and implementing community agricultural management projects and environmental sustainability in rural Malawi.

Total LandCare Skills and Experience

TLC has contributed extensively to the Agriculture Development Program (ADP) and has been widely consulted by the World Bank and the Norwegian Government in formulating their strategic country frameworks. Many others have sought input from TLC to improve the effectiveness of their programs. This demands stem largely from the successful results of USAID's Chia Watershed Project and its follow-on project Management for Adaptation to Climate Change (MACC) with the Norwegian Government. Once the Project is operational, it will provide a base for future projects related to biodiversity. TLC is also a member of the Civil Society Agriculture Network (CISANET) and heads the Irrigation Thematic Group whose mandate is to advocate policy reform in the irrigation sub-sector, to promote harmonization of methods/approaches and to share experiences.

Total LandCare is the lead institution for Project administration, partner coordination, community mobilization, decentralization-governance and monitoring & evaluation; will also coordinate livelihoods strategies with a focus on community-based natural resource management, diversification, conservation agriculture, irrigation, forestry, and enterprise initiatives based on agricultural & natural products.

TLC is led by Trent Bunderson, Ph.D. and Zwide Jere, who will serve as the *Rangeland Management Specialist* and *Land-use Planning Specialist*, respectively, for the Project. Blessings Mwale is currently Chief of Party for the Kulera Biodiversity Project and will serve as Project Manager for the Project.

Trent Bunderson has accumulated 28 years of professional development experience in Africa including 5 years with the Western Sudan Agricultural Research Project funded by USAID and the World Bank, and 23 years in Malawi, primarily with USAID projects. His work has included the diverse areas of: 1) assessing traditional land-use practices on range resources and wildlife populations, 2) research and development of agroforestry and conservation practices for crop and livestock production systems; 3) community-based systems of natural resource management from an ecological/watershed perspective; and 4) development and promotion of sustainable land and water management practices with a focus on conservation agriculture, agroforestry, and farm diversification. Trent currently provides leadership and technical.

Zwide Jere has 30 years of experience working with rural communities in partnership with government, non-governmental and private sector organizations. This gives him a unique privilege in handling issues that cut across these sectors. His strong capability is assessing and analyzing issues/problems of watersheds and resolving conflicts arising from resource uses by the different groups will add value to the

planned program. Mr. Jere's experience has been focused on the following areas: 1) land use planning; 2) natural resources management and environmental monitoring; 3) developing, testing and promoting soil conservation and agroforestry interventions; 4) community empowerment; 5) production of user-friendly high quality extension and training materials in the form of manuals, training kits, posters, leaflets and radio messages targeting different audiences; 6) training of trainers, extension agents and farmers in agroforestry, soil conservation, treadle pump irrigation, M&E, environmental monitoring and management, PRA, annual workplan development.

Blessings Mwale was the Project Manager for the Sustainable Land Management Programme in the Shire River Basin under UNDP, with financing from Global Environmental Facility (GEF); as well as for the Enhancing Food Security and Developing Sustainable Rural Livelihoods under the UN FAO, financed by the Royal Norwegian Government. Prior to these roles Blessings held a position with the UN World Food Programme, and worked as Food Security Advisory/Deputy Head of Programme.

Terra Global Capital Skills and Experience

Terra Global is the global leader in forest and land-use carbon advisory and finance. Terra was founded in 2006 to provide governments, NGOs and private companies with support for market and payment-for-performance based approaches that benefit rural communities. As proven innovators, Terra provides both technical advisory in the measurement and commercialization of emissions reductions and carbon finance through our dedicated Terra Bella Investment Fund and separately managed investment vehicles. Terra has established itself as a valued partner to a global client base by supporting the sustainable management of natural resources and through the development of rural livelihoods.

Terra Global is led by Leslie Durschinger, who will serve as Managing Director for Carbon Development for the Project. Other members of the Project Management Team include: Erica Meta Smith, *Field Carbon Development Specialist;* Benktesh Sharma, *Carbon Quantification Specialist*; Cheri Sugal, *REDD+ Development and Monetization Specialist;* Leslie Bolick, *Carbon Quantification Specialist*; and Jeff Silverman, *GIS and Remote Sensing Specialist*.

Leslie Durschinger, Managing Director for Carbon Development for the Project. Leslie is Terra's Founder and Managing Director, and leverages 20 years of experience and a proven track record in the financial services industry. Leslie founded Terra Global Capital in 2006 to facilitate payment-for-performance based approaches for forest and land-use emission reductions that provide community benefits. Prior to Terra, Leslie held senior management positions in the areas of derivatives trading, investment advisory, algorithmic trading, risk management, and securities lending. She is a member of the VCS AFOLU Steering Committee, REDD+ Social & Environmental Standards Committee, VCS JNR Permanence Work Group and Coalition of Agricultural GHG. Among her previous employers are JP Morgan, Merrill Lynch, Barclays Global Investors and Charles Schwab.

Erica Meta Smith, M.F., is a Registered Professional Forester through the State of California, Department of Forestry and Fire Protection, and a Certified Ecologist through the Ecological Society of America. Erica provides technical forestry knowledge, on-ground carbon quantification expertise, and specializes in forest mensuration projects. Erica has firsthand knowledge of a forestry-based income the experience of depending on natural resources as a livelihood;

Benktesh Sharma, Ph.D. is a forest management professional with 10 years of experience in modeling and simulation of forest management and terrestrial carbon sequestration, implementation of different forest management modalities, process optimization, and inventory and analysis of forest biomass and carbon. His areas of expertise include forest operations, climate change adaptation of forest resources and application of advanced computing technologies such as GIS, Remote Sensing and simulation.

Cheri Sugal, M.A. has 20 years of experience in conservation including leadership positions creating and financing rainforest protected areas world-wide in more than 30 countries. She holds an MA from Stanford University's Food Research Institute, in Agricultural and Development Economics; and has extensive experience in organizational and project management, fundraising, marketing and REDD+ and other Payment for Ecosystem Service systems.

Leslie Bolick, Ph.D., is a senior scientist and program manager in carbon development, greenhouse gas or forestry program. She is a specialist in applying science and technology to develop carbon projects for

voluntary and compliance markets, and bridging communication between science and business interests; and has proven experience in conducting and presenting scientific analysis and working with project developers, stakeholders, third party verifiers, carbon standards boards and registries to develop all technical aspects of the Rimba Raya REDD+ project in Indonesia.

Jeff Silverman, M.S., is a Spatial Scientist with expertise in remote sensing, spatial analysis, GIS, environmental science and ecology. Before joining Terra Global Capital he worked for the Center for Biodiversity and Conservation at the American Museum of Natural History (AMNH) where he provided spatial analyses for various research programs and assisted with conservation education programs. Prior to AMNH, Jeff worked as a spatial scientist specializing in vegetation mapping in environments ranging from arid drylands to wet tropical forests.

1.4.3 Plan to Provide Orientation and Training to the Project's Employees and Relevant People from the Communities

A substantial amount of training will be jointly organized by the local DNPW and other relevant Government departments, TLC and other local NGOs and provided to the Project's employees. Depending on the needs for the Project, these will include trainings in forest inventories, biodiversity assessments, silvicultural management for fire risk mitigation, Conservation Agriculture, enterprise development (e.g. small-scale livestock, coffee, macadamia, honey), establishment and management of tree nurseries and out-planting, care of out-planted trees as well as establishment and natural regeneration, natural regeneration management and construction and use of improved cookstoves.

In addition, a key component of the Project is to have local community members teaching and learning from each other through farmer-to-farmer visits and through facilitation by lead farmers or community extension workers who complement government extension service.

Specific information about TLC's orientation and training program for new employees can be found in the TLC Human Resource Management Manual, which was recently revised (March 2013) and can be provided to the Validators.

1.4.4 Equal Employment Opportunities for Local Community Members

TLC has a well-developed training program for employees and community members. Specifically, in the first four years of the Project, TLC provided local communities with training on a number of topics that will better prepare them for employment in the Project. The training and employment directly offered and created by the Project is supporting the creation of lifestyles that emphasize sustainable forest protection and forest stock enhancement. Thus, training topics include: agricultural extension and training, monitoring and evaluation, nurseries and tree planting, improved cookstoves, crop diversification, irrigation, enterprise development, and business skills and marketing. Documentation of community trainings and consultations can be made available to Validators

TLC is an Equal Opportunity Employer and aims to including community groups in the work that they do regardless of age, gender, ethnicity or other characteristics. Besides training their own staff, they aim to ensure that local community members involved in Project implementation activities are also adequately trained. Additional information about TLC's hiring policies can be found in the TLC Human Resource Management Manual and can be provided to the Validators.

Based on budget projections over the 30-year life of the Project, direct support for community forest protection and restoration will "employ" an estimated 50 full-time equivalent people annually from local communities, including Community Association officers, and support local DNPW officers and DNPW Administration. The approach TLC used in the Kulera Biodiversity Project was to engage community members with incentives. For example, Community Extension Workers were working on voluntary basis but had such incentives as bicycle and bicycle allowances. In total they had roughly 36 people covering the Natural Resource Zones from the two Associations. Jobs related to Project implementation range from initiation of local enterprises and management through Village Loan & Saving Schemes; and thus require a range of skill-sets. The Project will continue promote the Village Saving & Loan Scheme as a source of capital for starting different business enterprises of one's choice. This is also a good opportunity to create self- employment among the rural communities in the Project Zones and generate income

streams that will not only improve the livelihoods of the members participating in such programs but also create new employment opportunities for other members of the communities as those business enterprises grow.

Through PRAs, the Project proponents are already tracking whether specific community groups and households are underrepresented. They are ranked according to the wealth category they fall in, and very poor households are identified as a priority to benefit from Project implementation. Project proponents will organize training sessions targeting these underrepresented community groups and households to ensure the inclusion of such groups into employment activities. Special attention will be given to gender equality, and the participation of women in capacity building and employment activities.

1.4.5 Relevant Laws and Regulations Covering Workers' Rights.

The Project will meet or exceed all applicable national labor laws and regulations covering worker rights. Compliance will be achieved by the explicit approval of the work plans that the DNPW and Associations will develop on an annual basis. This will ensure that actions are consistent with the national legal framework. The Project managers will inform workers of their employment rights during community meetings. Documents explaining national rules on worker's rights and the obligations of both contracting parties will be made available in local languages when relevant. Below is a list of relevant laws and regulations covering workers' rights:

- Labour Relations Act (No. 16 of 1996)-
- Malawi Employment Act No 6 of 2000
- Employment Amendment Bill in Parliament 2010

1.4.6 Assessment of Risk to Worker's Safety and Plan to Communicate and Minimize Risk

During the work in the field, the main risks for the safety of workers include: malaria, falling trees in thinning operations, and bush fires. Malaria could be a risk for workers, especially when they are working in the forest for a long consecutive period. Falling trees are less of a problem as most of the thinning operations involve very small diameter shoots. Bushfires are a regular occurrence in the Project Areas during the dry season. However, they tend to be ground fires of lower intensity that can be easily avoided. Nonetheless, bush fires and fire-fighting activities pose a potential risk to workers.

Safety guidelines will be formulated to address risks that endanger worker health. In order to avoid accidents, daily staff briefings both in the morning and the late afternoon, will be compulsory. The Project Implementation team will review worker risks and mitigation strategies annually to ensure risks are minimized. Often disadvantaged groups become associated with jobs of greater health risk. Special attention will be given to make sure that work groups will be from diverse backgrounds and that knowledge of any risk associated with Project employment is understood by all means possible. The Project proponents will conduct sensitization meetings/campaigns with the Project beneficiaries on mitigation measures for any associated risks on the activities that they will be undertaking.

Additional information about TLC's workers' safety policies can be found in the TLC Human Resource Management Manual and can be provided to the Validators.

1.4.7 Financial Health of the Implementing Organization(s)

Total LandCare (TLC) was founded by Trent Bunderson and Zwide Jere, with a core mandate to improve the livelihoods of rural communities through sustainable agricultural practices and sound management of the natural resource base to ensure the long term integrity of biodiversity and the resource base. TLC is now an internationally known NGO registered and operating in Malawi, Mozambique, Tanzania and Zambia with funding from multiple international donor agencies: USAID, the Royal Norwegia Embassy, the European Union, FAO, and various private sector firms and foundations, such as Japan Tobacco Group, (JTG), Philip Moris International, and Imperial Tobacco. Currently, TLC operates on an average annual budget of US USD 10 million. Programs implemented involve community-based initiatives in agriculture, forestry and natural resource management. Their implementation includes a strong focus on

forming partnerships with Government institutions, donor agencies, NGOs, and other stakeholders to improve the scale and quality of results. A key thrust is to provide information to decision-makers to improve policies that support development and growth in a sustainable manner. Many programs are modeled after two USAID projects with Washington State University: the Malawi Agroforestry Extension Project from 1992-2004, and the Chia Watershed Management Project from 2004-2007.

In the recent years, TLC has continued to enjoy the trust and support by many donors as evidenced by extension/ expansion of its existing programmes such as with the Norwegian Government support on the Malawi Adaption and Climate Change (MACC) programme and / or new programmes such as the Building Resilience to Climate Change (BRCC), funded by the Department for International Development. This has come about because of the organization's effective implementation of its programmes that embraces key values of: results-based- "value for money"; "prudence", "accountability" and "transparency" in its operations. Thus, TLC's presence in the Project in the next foreseeable future is almost certain. TLC has also established good work relations with other partners with other local partners who have expressed interest to continue working with TLC in the Project sites such as MZCPCU, HIMACUL and SSLPP through joint resource mobilization or programme implementation. TLC will continue to mobilize resources to strengthen its programmes initiated in the first four years of the Project to register long term impacts of the interventions.

In addition, a detailed financial model has been prepared demonstrating that the revenue from the sale of emission reductions is sufficient to cover the costs of Project implementation and on-going carbon development is available to the validators.

1.5   Legal Status and Property Rights

1.5.1   List of Relevant Laws and Assurance of Compliance

Current forestry and related laws have come about as a result of pressures for democratization and land reform, and generally appear to create or reinforce a mandate for decentralization of authority, along with greater democracy and transparency in decision-making, particularly with respect to natural resource management. Prior to the advent of multi-party democracy in 1994, the President and the Minister of Land, were able to declare traditional lands as public, and lease them for commercial farming for up to 99 years. This resulted in a situation of land scarcity, tension, and encroachments on these estates – more so in the more densely populated southern region.

In 1995, following the advent of multi-party democracy in 1994, a new constitution was adopted that provided a mandate for representative local governments and led to land policy reform as well as a policy of decentralization, forest related policies that are particularly relevant for the Project.

The Project proponents hereby assure that the Project has and will comply with all the regulations mentioned in this section. The extensive stakeholder consultation process will ensure that compliance is achieved.

The Project activities comply with all Malawian laws. Listed below are a number of laws relevant to the Project. Combined, these policies create land tenure security for rural communities, a socio-economic framework for promoting sustainable management of Malawi's land resources for development, and an enabling environment for the success of the Project.

National Park and Wildlife Act, CAP 66 07 (1992) - The Project Areas are in legally recognized Projected Areas under the National Parks and Wildlife Act, CAP 66.07 (1992) as amended and the Regulations Game Act, CAP 66.03. Thus areas cannot be legally converted at any time in the future to non-forest and their status as protected areas constitutes a legally binding commitment. The National Parks and Wildlife Act was implemented to protect rare, endangered and endemic species of wild plants and animals and guides the established and management of national parks and wildlife areas throughout Malawi. It designates rare and endangered species that are protected under the Act and the administrative procedures required for species protection. This act provides for provisions for community co-management of national parks and the wildlife and forest resources found within the National Parks Amendment Act No. 15, 2004.

Park Declarations:

- Nyika National Park was first declared as a park on 1 January 1966 under the Game Ordinance. It was also known as Malawi National Park. In 1978 the park was extended to its present size by inclusion of the plateau's northern and southern foothills.
- Vwaza Marsh Wildlife Reserve was gazetted as Vwaza Game Reserve in 1977 under the Game Act , published as Government Notice No.33 of 1977.

According to the Protected Areas Master Plan for Central Region (Vol III, 1983) Nkhotakota Wildlife Reserve was declared in its present form by the Game Reserve (Declaration) Order, 1970, 26 October 1970, published as Government Notice No. 266 of 1970.**The Chiefs Act, 1967** - According to Chiefs Act 1967, traditional authorities, or "chiefs" may appoint Group Village Headmen and Village Headmen to assist him in carrying out his functions. Each village or group village, represented by a Group Village Headman that decides to enter into community forest management is required to elect a Village Natural Resource Management Committee (VNRMC) to represent their interests and act as points of liaison in dealings with forestry extension workers and other government officials. The VNRMC must also be willing to take on the lead role in forest planning, management and administration, and to participate in training. The Project will be implemented through these Headmen to aggregate individually owned trees planted in privately owned lands.

National Environmental Management Act, 1996 – Establishes the rules and regulations and procedures guiding Environmental Impact Assessments (EIAs). The Act led to the creation of the Environmental Affairs Department (EAD) in the Ministry of Natural Resources and Environmental Affairs which is responsible for the administration of the EIA process in Malawi.

Malawi Decentralization Policy, 1998- According to Malawi's Decentralization Policy 1998, District Assemblies make up Malawi's system of local government and can create committees at Area, Ward or Village level for purposes of facilitating participation of the people in the Assembly's decision making. The

District Assembly is comprised of an elected Chairman/Mayor and one councilor per Ward, as well as ex-officio non-voting members including the Traditional Authority and Sub-Traditional Authority from the local government area, 5 people appointed by elected members to represent special interest groups, and members of parliament from constituencies that fall within the local government area. In this sense, the District Assembly is both a governmental and "non-governmental" entity. This policy may authorize District Assemblies responsible for forest management and conservation on customary lands, including having the legal capacity for local level planning and licensing (FGLG 2008). Most of this responsibility rests with the District Forest Offices, which are accountable to the District Assemblies. The Project benefits by this decentralization policy as most of the legal decision can be made locally through district assemblies.

National Forest Programme, 2001 – Is intended to be the implementing program for the 1996 forest policy and Forest Act of 1997. It outlines a strategic framework of priorities and viable actions for improving forestry and livelihoods in Malawi. It aims to link policy and on-the-ground practice so that they support good forest and tree management as a means of alleviating poverty and improving livelihoods in Malawi.

Malawi National Land Policy, 2002– According to National Land Policy of 2001, the government may assign land as public land which any land that is held in trust and managed by the Government or Traditional Authorities and accessible to the public at large. Within the boundaries of Traditional Authorities public lands are lands that are not allocated exclusively to any group, individual or family; however, they are reserved for the exclusive use of members of the respective Traditional Authority. These include, for example, *dambos* or communal grazing and communal forest areas. The policy emphasizes that public lands held in trust for members of a particular community does not automatically transfer ownership of that land to the Headsperson, Chief or public official and therefore is not considered private. On the contrary, private lands, also called "customary estates," are customary lands that are allocated exclusively to a clearly defined community, corporation, clan, family or individual. Once registered customary estates provide the proprietor private usufructuary rights in perpetuity and can be leased or used as security for a mortgage loan. However, it is important to note that because the interest

of a customary estate is usufructuary only the sale, lease or mortgage are subject to what are known as the overriding interests of the community and the sovereign rights of the state.

Forest Act 1997, Forest Policy 1996, and Community Based Forest Management Policy in 2003 - The National Land Policy 2002 defines categories of land ownership in Malawi while the specific use of forest resources within these particular land tenure systems is defined in the National Forest Policy of Malawi in 1996 and further refined in Community Based Forest Management Policy in 2003. Specifically, the Community Based Forest Management Policy allowed for communities on customary lands – mostly unallocated customary lands – to achieve a full forest ownership and control through the conclusion of a Forest Management Agreement with the government. It is important to note that "ownership" in this sense also means *usufructuary*, or use rights, only. Forest Act 1997 requires charcoal production to be licensed, and for license applications to be consistent with approved forest management plans and agreements. The Project will conform to this law for any charcoal promotion in the Project Areas.

1.5.2   Demonstration of Approval from Authorities

In September 2013, the DNPW and NVA signed a REDD+ Agreement entitled: "Agreement for the Carbon Development, Carbon Rights, and Benefits Sharing with Respect to Emission Reductions for the Project between the DNPW, on behalf of the Ministry of Tourism, Wildlife and Culture, NVA and Terra Global Capital. The agreement was reviewed by three Ministries: the Ministry of Finance, the Ministry of Economic Planning and Development, and Ministry of Justice. All of their comments were incorporated into the final agreement. A similar agreement is being developed between the DNPW, NAWIRA and Terra Global Capital.

The purposes of these agreements are to affirm that the DNPW and NVA agree to co-manage and implement the Project activities to reduce deforestation and to formalize the roles and responsibilities that will be undertaken by the DNPW and the Community Associations in the Project. In addition, the DNPW and the Community Associations agreed on the terms by which emission reductions will be transferred and assigned to a REDD+ Public, Private Partnership that is currently being established as the entity for the sales of credits and to manage the revenue from carbon credit sales.

1.5.3   Demonstration that the Project Will Not Encroach on Private Property, Community Property or Government Property

The Project will not encroach uninvited on private property, community property, or any other government property. Within the Government of the Republic of Malawi, the DNPW oversees national parks and game reserves. The Project Areas are in legally recognized Projected Areas under the National Parks and Wildlife Act, CAP 66.07 (1992) as amended and the Regulations Game Act, CAP 66.03.

As supported by the 2004 Amendments to the National Parks and Wildlife Act (1992), Community Associations can enter into co-management agreements for the national parks and game reserves. DNPW and NVA currently have a co-management agreement covering the Nyika National Park and Vwaza Marsh Wildlife Reserve, and NAWIRA is in the process of developing a similar agreement with the DNPW.

1.5.4   Demonstration that Project does not Require Involuntary Relocation

The Project activities will not involve the resettlement of any communities or households, since Project goals include stopping settlements before they happen. Resettlement is not a component of the Project design nor would it be acceptable under Malawi Law.

None of the Project activities requires any relocation, voluntary or involuntary. The Project team is already conducting household surveys and participatory rural appraisals to better understand any migration patterns and drivers in the Project Areas. The Project team will organize a regular dialogue between the communities in the Project Zones to develop natural resource management plans, as well as guidelines and regulations covering land-use allocation. Project benefits will also target local migrant communities where necessary, to ensure incentives are in place to stabilize and guide land-use and land-use change in the Project Areas and leakage belt.

1.5.5 Identification and Mitigation of Illegal Activities that Could Affect the Project's Climate, Community or Biodiversity Impacts

This Project is designed to combat all illegal activities within the Project Areas. The most common illegal activities in the three protected areas are: forest fires for revenge (48%), collection of wood for cooking and heating locally (18%), and collection of fuelwood for tobacco curing (20%). (See Section 1.2.1 for a complete description of illegal drivers of deforestation). A number of Project activities are planned to mitigate the impacts of these illegal activities on the Project's climate, community and biodiversity. Specifically, the Project proponents will provide training and capacity building for communities to engage in participatory forest protection, and thereby enforce their co-management agreements. Training will include support to Community Associations in community mobilization, law enforcement and conflict resolution, and logistical support will be provided to protected areas officials to improve communications and mobility with GPS and radio units. The Project proponents will also conduct awareness campaigns through training of primary school teachers in environmental education, facilitation of the establishment of youth conservation clubs, protected area visits for youth clubs, initiation of the development of environmental education curricula development for primary schools and adults.

Specifically to mitigate the damaging effects of fires, the DNPW will develop jointly with the Associations a fire management plan, and implement fire management activities within the protected areas, including: installation of fire breaks, instituting early warning systems (e.g., use of mobile phones), clearing the forest of dead wood, discouraging fire for hunting, and warding off revenge-based fires. The Project will implement a fire control and management plan campaign to increase understanding and awareness of the program.

Other activities such as introducing fuel efficient cookstoves, developing alternative sources of fuelwood through agroforestry and farm woodlots management, as well as sustainable intensification of agriculture on existing agricultural lands will reduce the demand for fuelwood and agricultural land, thereby reducing the incidences of illegal activities inside the park boundaries.

1.5.6 Demonstration of Clear Title to Carbon Rights

The Project Areas are in legally recognized Projected Areas under the National Parks and Wildlife Act, CAP 66.07 (1992) as amended and the Regulations Game Act, CAP 66.03. The National Parks and Wildlife Act of 1992 provides the Minister with the authority to declare public land in Malawi as national parks or wildlife reserves. When each of the protected areas that form the Project Areas were gazetted they became the property of the Government of Malawi. Additionally, the 2004 Amendments to the National Parks and Wildlife Act (1992) allow Associations can enter into co-management agreements for the national parks and game reserves. The DNPW and NVA currently have a co-management agreement covering the Nyika National Park and Vwaza Marsh Wildlife Reserve.

The REDD+ Agreement entitled: "Agreement for the Carbon Development, Carbon Rights, and Benefits Sharing with Respect to Emission Reductions for the Kulera Biodiversity Landscape REDD+ Project in Co-Managed National Protected Areas in Malawi" signed between the DNPW, on behalf of the Government of Malawi, NVA and Terra Global Capital provides legal documentation demonstrating that the Project has been undertaken with the full consent of the carbon owners. Within this agreement, both the DNPW and NVA, agreed to transfer and assign all emission reductions generated from the Project to a Public Private Partnership Entity that will be established for the sales of those credits and to manage the revenue from carbon credit sales. A similar agreement is being developed between the DNPW, NAWIRA and Terra Global Capital.

2 CLIMATE SECTION

2.1 Net Positive Climate Impacts

The ex-ante estimated of the Project carbon stock change related emission reductions was based on VCS revised VM0006.

2.1.1 Net Change in Carbon Stocks due to Project Activities

Table 11. Estimate emission reduction under Project scenario

YEAR	Estimated Project emissions or removals (tCO2e)
2009	(570,631)
2010	(547,875)
2011	(507,070)
2012	(412,777)
2013	(340,841)
2014	(333,217)
2015	(244,192)
2016	(232,077)
2017	(178,460)
2018	(155,990)
2019	(132,170)
2020	(108,375)
2021	(100,105)
2022	(93,527)
2023	(88,287)
2024	(83,201)
2025	(79,682)
2026	(76,288)
2027	(73,850)
2028	(71,672)
2029	(57,435)
2030	(44,335)
2031	(32,493)
2032	(22,958)
2033	(15,321)
2034	(7,933)
2035	(2,690)
2036	2,252
2037	5,968
2038	9,263
Total	(4,595,969)

2.1.2 Net Change in Emissions of Non-CO$_2$ Gases

Sources of increased GHG emissions in the Project are emission from vehicular use for patrolling and increased use of synthetic fertilizer. These sources are insignificant.

2.1.3 Other GHG Emissions from Project Activities

2.1.3.1 GHG Emissions Reduction from Cookstoves and Fuel Efficiency (CFE) Activities

We estimated that current consumption of fuelwood is about 27.12 t dry matter (DM) per household per year. According to CDM, the non-renewable fraction of woody energy for Malawi is about 81%. Reducing the demand for fuel through adoption of cookstoves will lead to a direct reduction in the unsustainable harvesting of fuelwood. Different types of cook stoves are in use in the Project area, and are being made by local communities. The thermal efficiency has been determined by TLC, in which they estimate that fuelwood consumption is reduced by 80% compared to traditional three stone stoves in Malawi with an efficiency of 26% compared to the 10% of thermal efficiency of three stone stoves used in the project area under the baseline. Less than 5% of the sampled households had the improved cookstove in the project area prior to this project activity. As of the writing of this document, the households are continue to use and maintain the cook stoves. The Project expects (conservatively) that they will be able to achieve 35,000 adoption of improved cook stoves in their households by year 6 of the Project. This will reduce of consumption of fuel-wood reduce the annual emissions by 3.49 tCO2 per household per year. These cookstoves would be maintained throughout the project crediting period.

By applying the quantification approach in revised VM006, Table 12 provides the estimated emission reductions from cookstoves.

Table 12. Emission reductions from Cookstoves

Year(t)	GHG emission reductions from cook stoves
1	24,461
2	36,692
3	48,923
4	85,615
5	110,076
6	122,307
7	122,307
8	122,307
9	122,307
10	122,307
11	122,307
12	122,307
13	122,307
14	122,307
15	122,307
16	122,307
17	122,307
18	122,307
19	122,307
20	122,307
21	122,307
22	122,307
23	122,307
24	122,307
25	122,307
26	122,307
27	122,307
28	122,307
29	122,307
30	122,307
Total	3,363,433

2.1.4   Net Climate Impact of the Project

Based on the procedures required in VCS methodology revised VM0006, Table 13 provide the net emission reduction impact of the Project.

Table 13. Net emission reductions (ex-ante) impact of the Project

YEAR	ΔGHG from avoided deforestation (Project – Baseline) [t CO$_2$e]	ΔGHG from deforestation due to leakage [t CO$_2$e]	GHG from improved cookstoves [t CO$_2$e]	GHG from Emission sources [t CO$_2$e]	NER [t CO$_2$e]	Risk Buffer [%]	Buffer [t CO$_2$e]	VCU [t CO$_2$e]
2009	79,637	-9,129	24,461	0	94,969	10.00	-7,964	87,005
2010	113,550	-13,247	36,692	0	136,995	10.00	-11,355	125,640
2011	165,085	-17,682	48,923	0	196,326	10.00	-16,508	179,817
2012	269,515	-29,342	85,615	0	325,788	10.00	-26,952	298,837

YEAR	ΔGHG from avoided deforestation (Project – Baseline)	ΔGHG from deforestation due to leakage	GHG from improved cookstoves	GHG from Emission sources	NER	Risk Buffer	Buffer	VCU
2013	351,082	-38,870	110,076	0	422,289	10.00	-35,108	387,180
2014	367,916	-40,136	122,307	0	450,086	10.00	-36,792	413,295
2015	465,288	-49,942	122,307	0	537,652	10.00	-46,529	491,123
2016	485,433	-51,398	122,307	0	556,342	10.00	-48,543	507,799
2017	546,610	-57,573	122,307	0	611,344	10.00	-54,661	556,683
2018	576,038	-59,860	122,307	0	638,485	10.00	-57,604	580,881
2019	596,657	-61,051	122,307	0	657,912	10.00	-59,666	598,246
2020	616,818	-62,098	122,307	0	677,026	10.00	-61,682	615,345
2021	620,802	-61,914	122,307	0	681,195	10.00	-62,080	619,115
2022	624,026	-61,603	122,307	0	684,729	10.00	-62,403	622,326
2023	624,336	-61,157	122,307	0	685,486	10.00	-62,434	623,052
2024	625,139	-60,776	122,307	0	686,669	10.00	-62,514	624,155
2025	624,308	-59,352	122,307	0	687,262	10.00	-62,431	624,832
2026	621,997	-29,633	122,307	0	714,671	10.00	-62,200	652,471
2027	619,847	-29,367	122,307	0	712,787	10.00	-61,985	650,802
2028	617,388	-29,075	122,307	0	710,619	10.00	-61,739	648,880
2029	612,976	-78,628	122,307	0	656,655	10.00	-61,298	595,357
2030	605,856	-80,371	122,307	0	647,792	10.00	-60,586	587,206
2031	598,391	-83,174	122,307	0	637,524	10.00	-59,839	577,684
2032	587,502	-85,224	122,307	0	624,585	10.00	-58,750	565,835
2033	575,262	-59,815	122,307	0	637,753	10.00	-57,526	580,227
2034	561,019	-60,982	122,307	0	622,343	10.00	-56,102	566,241
2035	542,911	-63,514	122,307	0	601,703	10.00	-54,291	547,412
2036	523,388	-68,216	122,307	0	577,479	10.00	-52,339	525,140
2037	498,908	-70,524	122,307	0	550,691	10.00	-49,891	500,800
2038	460,430	-80,100	122,307	0	502,637	10.00	-46,043	456,594
Total	15,178,113	-1,613,752	3,363,433	0	16,927,794	0	-1,517,811	15,409,983

2.1.5 Specification on How Double Counting is avoided

The emission reductions generated from the Project will be registered under the VCS and sold under that mechanism. The Project has not been registered, nor is seeking registration under any other GHG program.

In addition the credits will be placed in the Markit Registry, which converts a verified emissions reduction into a saleable asset complete with a unique identifier number. This ensures complete transparency and enables the credits to be tracked throughout their entire life-cycle. Retired credits are held in a "lock box" by the registry, thereby preventing double counting - ensuring the same credits are not re-issued or sold again at a later date.

In addition, the Community Associations will maintain agreements with each community to ensure that credits are only sold by the FA so that duplicate sales of the same credits cannot occur.

2.2   Offsite Climate Impacts ('Leakage')

2.2.1   Determination of Leakage Type and Extent

2.2.2   Documentation and Quantification of How Leakage will be mitigated

Leakage mitigation is integrated within the Project activities. Given that Project Area is comprised of protected areas without communities living in them and the Project Zone, where activities are being implemented, covers an area larger the Leakage the Project activities have been designed to address leakage rather than have separate activities that address leakage.

Under the methodology used by this Project revised VM006 specifies different ways to estimate and measure leakage based on whether it is activity shifting with is geographically constrained, is activity shifting with is geographically unconstrained, and/or market leakage. Leakage is estimated *ex-ante*, but actual NERs are based on actual leakage calculated with Project monitoring data. Leakage, if it occurs, does not only occur on forest land outside of the Project Area, but also on non-forest land, such as woodlands or grassland.

The market leakage assessment only has to be included when illegal logging activities that supply timber to national or international markets as an identified driver. As provided in Section 1.2.1.2 there are not drivers such as timber to regional or international markets presence in the Project Area and thus there is no market leakage for this Project.

2.2.2.1   Estimate Leakage from Geographically Constrained Drivers

Leakage from geographically constrained drivers is may take place in areas adjacent to the Project Area i.e. in the leakage belts. All of the drivers identified as active in the Project Area in Section 1.2.1.3, are identified as drivers that could result in geographically constrained leakage within the Leakage Belt. A justification of each of the leakage cancellation rates used for ex-ante estimates is provided below. These estimates were derived from PRAs and meeting with local community leaders.

2.2.2.1.1   Demarcate the Leakage Belts

The leakage area was selected to be sufficiently large to encompass all forests around the Project Areas that could be under higher pressure during the Project's lifetime. The location was selected by taking into account the "cost" local agents of deforestation would need to incur to move their activities. It is assumed that leakage will only occur when the cost to displace the deforestation activity is below a certain threshold or is less than alternative resources. To select the extent of the leakage area, this threshold was set conservatively by using the maximum distance travelled for forest products, 10 km, as reported in the Participatory Rural Appraisals. Leakage from drivers of deforestation that are not constrained by geography is discounted by using a factor approach

The cost distance analysis was conducted using the Spatial Analyst extension for ArcGIS software. This process requires a Cost Weight surface and the source(s) of displacement, which are the Project Areas. An initial step of setting the potential bounds of the Leakage Belt was conducted by excluding the Protected Area cores (5 km inside the Protected Area boundaries) inside Zambia and Lake Malawi.

The Cost Weights surface was created by assigning the following weights for roads, assuming that one can travel easier (thus farther) on Primary Roads:

- Primary Roads = 5
- Secondary Roads = 7
- Tertiary Roads = 10
- Tracks = 15

Weights assigned to terrain outside of the road network used rivers and terrain ruggedness as factors. A Digital Elevation Model (DEM), SRTM, was used to calculate a Terrain Ruggedness Index (TRI) which determines how difficult terrain is to traverse: The following weights were assigned to the Cost Weights surface for terrain outside of the road network:

- Level ground = 20
- Rivers = 30
- Difficult Terrain = 30
- Rugged Terrain = 50
- Very Rugged Terrain = 100

The Cost Distance output is a raster grid with values indicating the cost of traversing each pixel. These values increase in cost based on distance from the Project Areas with weighting values added depending on the type of road for travel over the road networks or weighted by the difficulty of terrain, such as crossing rivers or steep hills. To set the threshold for bounding the Leakage Belt, Cost Distance values were sampled where Primary Road routes crossed a 10 km buffer. Nine sample locations, where a relatively straight road segment extended between the Project Area and the 10 km buffer, were identified. The mean Cost Distance value was calculated from these nine points, thus setting the extent of the Leakage Belt. This produced a Leakage Belt comprising of 367,882 ha (Figure 28) provides an illustration of the Cost Distance output and the method of setting the threshold. See Figure 29 for the full extent of the leakage belt.
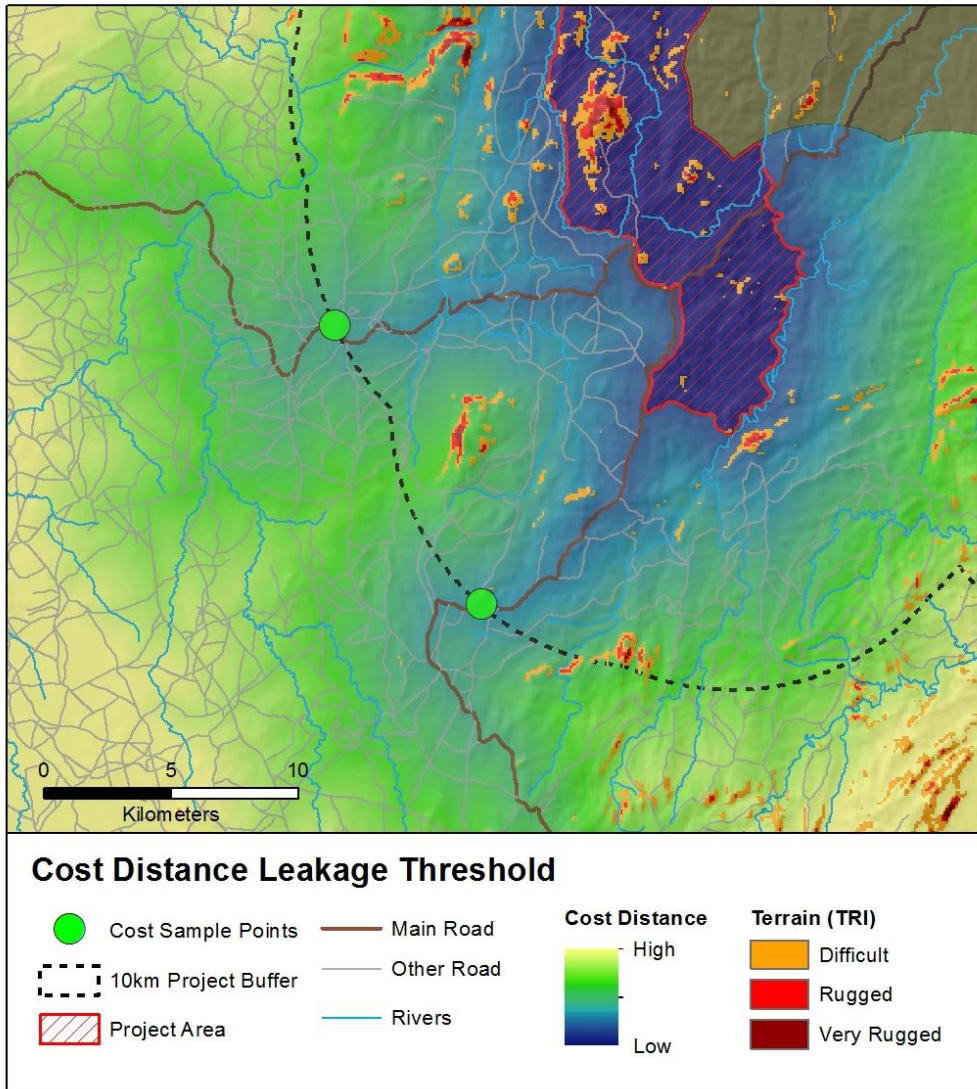
Figure 28. Method of setting the Cost Distance threshold for defining the Leakage Belt boundaries.

The Leakage Belts are notated on Figure 29.
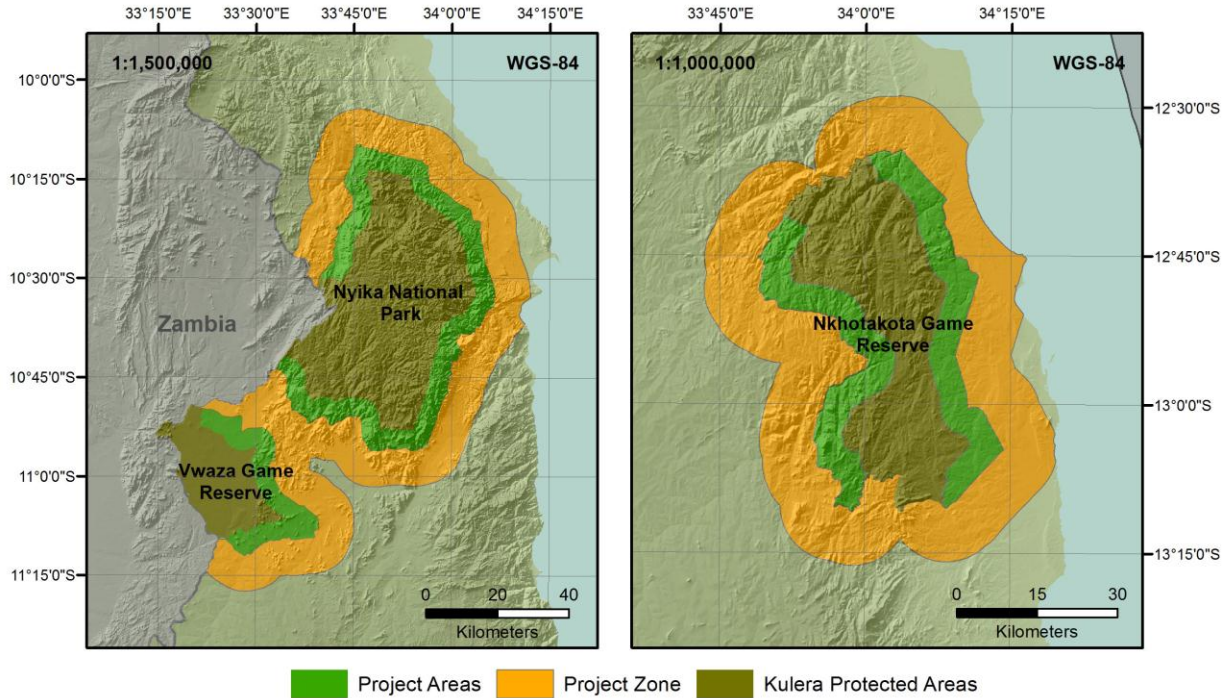
Figure 29. The Project Areas of the Kulera Biodiversity Project consist of a 5 km buffer area inside the protected areas and the Project Zone is 10 km buffer outside of 3 protected areas in Malawi.

2.2.2.1.2   Leakage Cancellation Rates for Ex-Ante Estimates

2.2.2.1.2.1   *Wood for charcoal*

Charcoal is mainly created by local communities and newly settling migrant communities to generate income by selling to people along the roads coming to and from towns. The income generating opportunities implemented within the Project will decrease the local production of charcoal as well as the adoption of improved woodstoves. However, this will challenging driver to address and it is estimated that some of the local charcoal producers with travel into the leakage belts to continue their practices and thus we conservatively estimate 20% leakage cancellation has been estimated.

2.2.2.1.2.2   *Conversion of forest to small-scale agriculture*

Local farmers and newly settling migrants that are coming to reside within the Project Zone that are converting forest to agricultural land are doing so for subsistence agriculture. These communities who either already reside or come to settle in the Project Zone will not move far from their villages to continue this practice as they are estimated to keep their activities within 1 km of the village. Additional Project activities include conservation agriculture, irrigation, and intensification to increase crop yields. It is estimated that the leakage cancellation will be zero.

2.2.2.1.2.3   *Forest fires by hunters (mice hunters)*

This driver is undertaken as an "opportunist" activity within the Project Areas by the mice hunters living near the Project Areas. Most Tumbuka people do not eat mice. This is mostly practiced by Chewa migrants who have come to the North from the Central part of the country to live and work on tobacco farms and other estates. Some local people have adopted this practice, but they are few. Given the opportunistic nature of this activity, these hunters will not likely travel far to set fires to extract mice. This is estimated to be as low as 5% leakage cancellation.

2.2.2.1.2.4 Forest fires for other anthropogenic reasons.

These fires are primarily from hunters and poachers to concentrate game animals deep in the Project Areas. This is a practice that is done by a limited number of people near Nyika and Vwaza Protected Areas, but it is passed down through generations. This occurs in spite of local efforts by DNPW and NVA to "civic educate" the people on the negative impacts of poaching to the environment and to the community, since it reduces the amount of benefits they receive from revenue-sharing with the DNPW. It is estimated that leakage cancellation would be 2% since fires were set by only a few individuals in specific locations.

2.2.2.1.2.5 Other

As these are non-anthropogenic and thus would not be removed into the leakage belt, the leakage cancellation is zero.

2.2.2.1.2.6 Wood and poles for construction and domestic use

The need for timber on a local level will not decrease as a result of Project implementation. Local communities will shift the location of their timber harvesting to the leakage belt surrounding the Project Areas to harvest wood. It is anticipated that timber harvesting for local use to continue, resulting in a 100% leakage cancellation rate.

2.2.2.1.2.7 Wood for cooking and heating locally

Adopting efficient cookstoves by the communities in the Project Zone will significantly reduce the amount of fuelwood use, and should not result in significant leakage. In addition, the Project supports establishing for sustainable village woodlots, which will provide an alternative source of sustainable fuelwood versus communities unsustainably using wood from the Project Area There will not, however, be a 100% adoption rate for these new technologies, nor will the woodlots completely meet the wood requirements, so a 5% leakage cancellation rate has been conservatively estimated.

2.2.2.1.2.8 Wood for tobacco curing

There are numerous programs in addition to this Project that are working with tobacco farmers to encourage them to plant their own woodlots to meet their fuelwood needs to cure tobacco. These interventions have been successful. Now, programs are starting to introduce coal to cure the tobacco instead of firewood, which will reduce demand for wood, eliminating the need to move their activities into the Leakage Belt. The leakage cancellation is estimated to the zero.

Table 14. Estimated leakage cancellation rates per deforestation driver.

Driver of Deforestation	Deforestation Geographically constrained
Wood for cooking and heating locally	5%
Wood and poles for construction and domestic use	100%
Wood cut into planks for regional sale	n/a
Wood for brick making/kiln	n/a
Wood for tobacco curing	15%
Fuelwood for furniture and woodcarving	n/a
Grazing in forest	n/a
Forest fires for other anthropogenic reasons	2%
Collection of understory/grass for thatch and fences	n/a
Conversion of forest to small-scale agriculture	0%
Conversion of forest to settlements	n/a
Forest fires by hunters (mice hunters)	n/a
Collection of wood for charcoal	20%
Fire to contain animals inside the park	n/a
Cutting wood from boat making	n/a
Fires to collect honey	n/a

n/a = driver not active in Project Area

Table 15. Emissions from Leakage from Geographically Constrained Drivers

YEAR	Estimated leakage emissions (tCO2e)
2008	9,129
2009	13,247
2010	17,682
2011	29,342
2012	38,870
2013	40,136
2014	49,942
2015	51,398
2016	57,573
2017	59,860
2018	61,051
2019	62,098
2020	61,914
2021	61,603
2022	61,157
2023	60,776
2024	59,352
2025	29,633
2026	29,367
2027	29,075

YEAR	Estimated leakage emissions (tCO2e)
2028	78,628
2029	80,371
2030	83,174
2031	85,224
2032	59,815
2033	60,982
2034	63,514
2035	68,216
2036	70,524
2037	80,100
Total	1,613,752

2.2.2.2   Estimate Leakage from Geographically Unconstrained Drivers

Leakage from geographically unconstrained drivers can occur in areas beyond and far away from the Project Area. In the Project, there are no drivers and agents that would lead to geographically unconstrained leakage.

The analysis of drivers did not result in the identification of geographically unconstrained drivers. The project area is mostly surrounded by the communities living in the region for long time and most of the deforestation seemed partly caused by population growth as applicable for the entire country. For example, the net forest cover in Malawi was found to be inversely proportional to the population density (Figure 30) and this was found to be true in the case of project area due to absence of geographically unconstrained drivers.
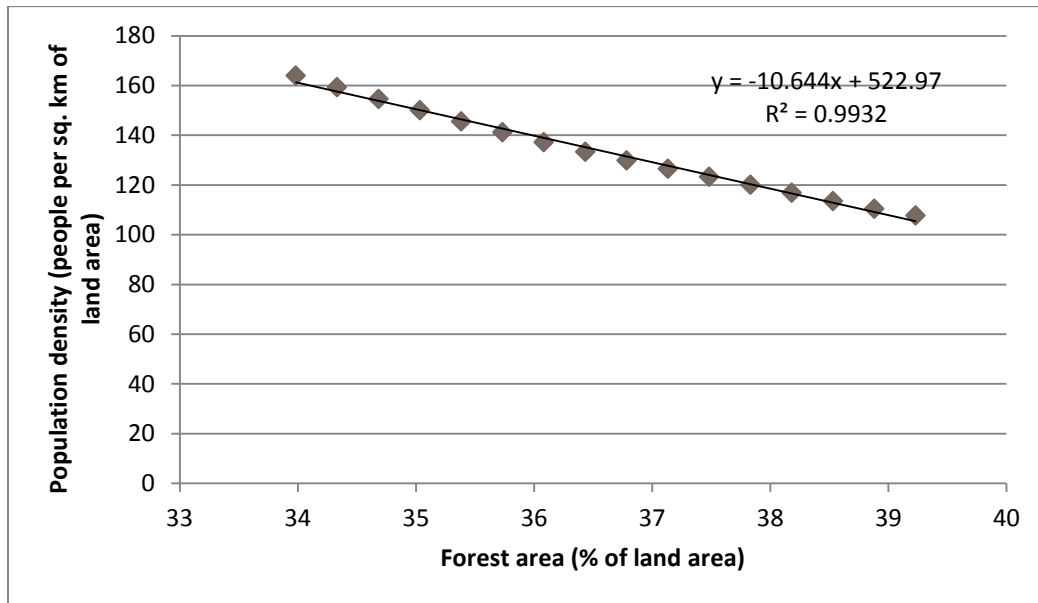

Figure 30. Relationship between forest cover and population density in Malawi

2.2.3 Subtracting Project related Leakage from Carbon Benefits

YEAR	ΔGHG from avoided deforestation (Project – Baseline) [t CO$_2$e]	ΔGHG from deforestation due to leakage [t CO$_2$e]	GHG from improved cookstoves [t CO$_2$e]	GHG from Emission sources [t CO$_2$e]	NER [t CO$_2$e]	Risk Buffer [%]	Buffer [t CO$_2$e]	VCU [t CO$_2$e]
2009	79,637	-9,129	24,461	0	94,969	10.00	-7,964	87,005
2010	113,550	-13,247	36,692	0	136,995	10.00	-11,355	125,640
2011	165,085	-17,682	48,923	0	196,326	10.00	-16,508	179,817
2012	269,515	-29,342	85,615	0	325,788	10.00	-26,952	298,837
2013	351,082	-38,870	110,076	0	422,289	10.00	-35,108	387,180
2014	367,916	-40,136	122,307	0	450,086	10.00	-36,792	413,295
2015	465,288	-49,942	122,307	0	537,652	10.00	-46,529	491,123
2016	485,433	-51,398	122,307	0	556,342	10.00	-48,543	507,799
2017	546,610	-57,573	122,307	0	611,344	10.00	-54,661	556,683
2018	576,038	-59,860	122,307	0	638,485	10.00	-57,604	580,881
2019	596,657	-61,051	122,307	0	657,912	10.00	-59,666	598,246
2020	616,818	-62,098	122,307	0	677,026	10.00	-61,682	615,345
2021	620,802	-61,914	122,307	0	681,195	10.00	-62,080	619,115
2022	624,026	-61,603	122,307	0	684,729	10.00	-62,403	622,326
2023	624,336	-61,157	122,307	0	685,486	10.00	-62,434	623,052
2024	625,139	-60,776	122,307	0	686,669	10.00	-62,514	624,155
2025	624,308	-59,352	122,307	0	687,262	10.00	-62,431	624,832
2026	621,997	-29,633	122,307	0	714,671	10.00	-62,200	652,471
2027	619,847	-29,367	122,307	0	712,787	10.00	-61,985	650,802
2028	617,388	-29,075	122,307	0	710,619	10.00	-61,739	648,880
2029	612,976	-78,628	122,307	0	656,655	10.00	-61,298	595,357
2030	605,856	-80,371	122,307	0	647,792	10.00	-60,586	587,206
2031	598,391	-83,174	122,307	0	637,524	10.00	-59,839	577,684
2032	587,502	-85,224	122,307	0	624,585	10.00	-58,750	565,835
2033	575,262	-59,815	122,307	0	637,753	10.00	-57,526	580,227
2034	561,019	-60,982	122,307	0	622,343	10.00	-56,102	566,241
2035	542,911	-63,514	122,307	0	601,703	10.00	-54,291	547,412
2036	523,388	-68,216	122,307	0	577,479	10.00	-52,339	525,140
2037	498,908	-70,524	122,307	0	550,691	10.00	-49,891	500,800
2038	460,430	-80,100	122,307	0	502,637	10.00	-46,043	456,594
Total	15,178,113	-1,613,752	3,363,433	0	16,927,794	0	-1,517,811	15,409,983

2.2.4 Inclusion of Non-CO$_2$ Gases in Calculations

There are not Project Activities that create non CO$_2$ Gases.

2.3 Climate Impact Monitoring

2.3.1 Development of Full Monitoring Plan

This project will monitor all required components according to the VCS methodology. In general, the following components for calculating actual GHG benefits generated by the Project, or Net anthropogenic Emission Reductions (NERs) are included in the monitoring plan.

- Monitoring of deforestation drivers, project activities and emission sources related to REDD project activities inside and outside of the project area.
- Monitoring LULC class and forest strata transitions in the project area, leakage area and reference region using remote-sensing technologies and validated with ground-truthing data.
- Monitoring carbon stock densities in LULC classes and forest strata.
- Monitoring carbon stock increases in the area on which ANR is performed.
- Monitoring of any natural disturbances regardless of the cause of the loss.

Before every verification event, a monitoring report will be produced which contains all of the information above, and which outlines the calculations for actual NERs generated. At every verification event, project proponents will attest that no other land-based carbon projects registered under any other carbon trading scheme (both voluntary and compliance-oriented) are present in the project area.

Note that any natural disturbance is fully accounted as part of the on-going monitoring during the crediting period. Any loss of biomass during the credited period is monitored and accounted for regardless of the cause of the loss

2.3.2 Organizational Structure, Responsibilities and Competencies

- **Total LandCare**. During the first five years after validation of the project, the implementing partner (TLC) is responsible for managing, outsourcing and collecting the results of (1) biomass inventory measurements, (2) social assessments, (3) recording action activity implementation, and (4) any other data required to be monitored under this methodology. TLC will execute first-pass of quality assurance and quality control (QA/QC) checks on all of the data collected by them or any other partner. TLC will keep records of all field inventory and social appraisal data sheets and all other evidence demonstrating the correct execution of project implementation.

- **Department of Parks and Wildlife**. During the first five years of the project, the DPW will provide assistance in the field inventory measurements, and review the monitoring reports. The DPW will be trained to become the responsible party for all monitoring requirements five years after validation of the project.

- **Terra Global Capital**. During the first five years after validation of the project, Terra Global Capital is responsible for verifying that the required elements are monitored, overseeing or executing all modeling and calculations, and performing second-pass QA/QC checks. In addition, Terra Global Capital is responsible for developing the monitoring reports during the first five years after validation of the project.

- **Nawira and the Nyika-Vwaza Associations**. Report natural disasters and challenges related to forest protection, reports drivers of deforestation and suggested changes to project actions. The communities of the Nawira and the Nyika-Vwaza Associations have the responsibility to carry our project actions where appropriate.

2.3.3 Managing Data and Data Quality

The data quality will be maximized and ensured during all aspects of the monitoring process by quality assurance and quality control (QA/QC) procedures. To monitor field inventory data, data analysts, and involved individuals/institutions in evaluating the quality of analytical data, rigorous QA/QC procedures are developed relevant to this project. The QA/QC procedures include specific criteria to evaluate the quality of analytical data that has been gathered. The QA/QC procedures are therefore an absolutely essential part of monitoring.

2.3.3.1   Procedures for Handling Internal Auditing and Non-conformities

The Kulera Biodiversity Project involves a wide range of stakeholders at village, community, zone, and national levels. The success of this long-term project depends on the ability of the stakeholders to effectively and amicably resolve any problems and issues that arise during implementation. As such, the project has developed policies and procedures providing guidance to project stakeholders on how to resolve resolving complaints and grievances.

The Project Stakeholders are defined as any individual with a stake in the implementation and outcomes of the Kulera Biodiversity Project. These include community members, local authorities, and NGOs.

The Project Team is defined as the core project management group composed of Total LandCare, Department of Parks and Wildlife,, and the Nawira and Nyika-Vwaza Associations. Each institution shall assign one individual as its focal point membe. In addition, one Project Team member shall be designated as the group's Secretary responsible to keep and track records of meetings and correspondence.

Project Stakeholders may raise complaints and grievances to the Project Team or its member either verbally or in writing. The Project Team's Secretary is obliged to (1) record every complaint and keep track of the status, and (2) keep complaints and grievances confidential unless otherwise directed by the Project Stakeholder.

2.3.3.2   Monitoring Reporting

Monitoring will take place continually through the life of the Kulera REDD+ project. During each verification event a Monitoring Report will contain the *ex-post* values of the actual net GHG emission reductions. Actual net NERs must be based remote sensing, biomass inventories, and social surveys, and must follow steps in the methodology. Social data and biomass inventories gathered at Validation can be used for the first Monitoring Report.

COMMUNITY SECTION

2.4   Net Positive Community Impacts

2.4.1   Net Positive Community Impact Methods

The deforestation mitigation activities of the Project have been designed to under a vision to help transform impoverished communities on degraded lands to prosperous communities on healthy lands. One of the key indicators for success of the Project is that there is an increase in the number of people with economic benefits derived from sustainable natural resource management and conservation as a result of the Project. In order to assess and continually monitor the impacts that the Project is having on communities, TLC has developed a community monitoring program. To establish a an initial socio-economic baseline TLC hired researchers from the University of Malawi and Bunda College of Agriculture to conduct a series of household surveys, village Participatory Rural Appraisals (PRAs), and mapping exercises to assess the impact of the Project on communities located in the Project Zones. The socio-economic baseline survey was conducted over 13 weeks between December 2010 and March 2011 and consisted of household surveys and focus group discussions.

A total of 1924 households were surveyed with a structured questionnaire in the Project Zones and the control area. The sample consisted of 1066 households in the Project Zones and 858 households outside of the Project Zones, from non-Project intervention sites, as a control group (Phiri, Mapemba, and Sopo 2011). Participants for the household interviews were identified using a stratified random sampling method and the sub-samples reflected the relative distribution of population in the three Project Areas.

The largest sub-sample was obtained from Nyika National Park (839 households), followed by Nkhotakota Wildlife Reserve (792 households), and Vwaza Wildlife Reserve (293 households). Of those surveyed, 48% were women and 52% were men. These surveys were designed to collect data on household demographics; household income levels/sources; household land holdings; level of household food security; household farming systems; household access to markets; household access to fuel

wood/building materials; clean water; health and sanitation services; household access to agricultural extension services and to schools; and natural resource exploitation patterns and behaviors (Phiri, Mapemba, and Sopo 2011).

Focus group discussions were conducted in the 38 Extension Planning Areas (EPA) within the Project Areas. These focus group discussions encouraged communities to undertake a needs assessment with respect to their current livelihood situations, a critical analysis of livelihoods strategies including socioeconomic situation, water and sanitation as well as environmental mitigation situations and carbon sequestration activities such as: avoided deforestation (natural resource management behavior), woodland management, reforestation, agroforestry, and conservation agriculture. Participants included men, women, youth, community leaders, religious leaders, and members of community-based organizations and committees including school and water management committees.

In June and July 2012, a total of 38 PRA discussions were held representing each traditional authority (TA) area falling within the Project Areas. The PRA discussions focused on the local drivers of deforestation and forest degradation; strategies on how to reduce deforestation; possible challenges; management of forest fires; and transportation of timber, fuelwood and NTFPs. The PRAs also included community wealth ranking and community mapping exercises. Participants in the PRA discussions included:

- NTFP users
- Village leaders
- Village elders or TAs
- Female head of households
- Members of the VNRC
- Wildlife hunters
- Farmers
- Shopkeepers and entrepreneurs
- Community members who may have land inside the Protected Area or VFA
- Members of underrepresented groups such as ethnic minorities, the very poor, and women

In addition, the chairperson of the NVA, along with extension officers from the DNPW, have conducted preliminary introductions to the Project during community meetings with the VNRCs. The chairman together with the DNPW staff made specific visits to meet members in each Natural Resource Zone where the community members would be sensitized and briefed about the Project and respond to any Positive Community Impacts

The Project will provide a number of benefits to communities grouped according to three overarching intermediate results:

Intermediate Result #1: Improved Governance of Protected Areas

Improved governance of protected areas will result from the development of decentralized participatory structures, such as that developed by NVA. Local communities will benefits from the resulting strengthened land tenure and economic incentives that support natural resource management.

Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices

The livelihoods of communities around protected areas will be improved through diverse interventions tailored to meet site-specific needs. Environmental stewardship will be incorporated in all land and water management practices to ensure sound management of the resource base. Results will enhance community capacity for adaptation to climate change, and will reduce incentives for illegal encroachment and exploitation of reserve resources. The main outcomes will be increased food security, nutrition and incomes; incorporation of sustainable land and water management practices; and introduction of village savings and loans

Intermediate Result #3: Increased Incomes from Enterprise Initiatives

Communities will benefit from the ventures being developed under the Project, including those have been proven to have the most promising results: bee keeping, tree crops such as coffee, macadamia, small livestock,and eco-tourism.

The Project proponents will monitor specific community impact variables, which arepart of the broader Project monitoring plan aimed at monitoring the Project's climate, community and biodiversity impacts. A participatory approach, including household surveys to acquire quantitative data and PRAs and focus groups to acquire qualitative data, will be used to monitor the impacts that the Project has on communities. This approach will identify communities that are directly and indirectly affected by the Project by clearly identifying each village and household within the Project Zones and leakage belt. The socio-economic baseline survey and the PRA discussions have formed the basis for the creation of the Project's community impact monitoring plan, which is intended to measure the impact of the Project on the participating communities. Based on the baseline community and livelihood data, this monitoring plan will allow for a detailed qualitative and quantitative assessment of community impacts from the Project over the baseline scenario. A more detailed description of the monitoring plan and specific variables that will be monitored is presented in Section 2.6.

2.4.2 Demonstration that No HCV Areas Will Be Negatively Affected by the Project

The HCV areas of special environmental, biological, and rare ecosystem significance described in Section 1.1.4.2 are expected to flourish with implementation of the Project activities. Since the goal of the Project is to enhance and protect forest resources, HCV areas will not be negatively affected. Specifically, the ecologically valuable sites identified by the communities were all located inside of the protected area boundaries. Culturally significant sites within village areas were identified by every community included in the PRAs. These include *dambwe* (shrines for the spiritual masked society known as the *Nyau* or *Gule Wamkulu*), and sacred groves protecting grave yards and burial sites (Phiri, Mapemba, and Sopo 2011). Trees are never cut or cleared from grave yards and sites of religious significance, and as such, these stands of trees create small groves of high cultural importance (Sheridan and Nyamweru 2008). Some communities also identified historic grave yards within the protected areas dating from the time period before communities were evicted from the protected areas included in the Project (Phiri, Mapemba, and Sopo 2011).

2.5 Offsite Stakeholder Impacts

2.5.1 Identification of Negative Offsite Stakeholder Community Impacts

The PRA indicates that the distance of community impact beyond the Project Areas. (Phiri, Mapemba, and Sopo 2011). For example, the survey examined the distance travelled and time taken for households to access the nearest source of fuelwood (on average 1.58 kilometers and 70 minutes to and from the nearest source of fuelwood). This is important because time is extremely valuable. Enforcing the boundaries of protected areas could increase the amount of time that local community members must travel to access fuelwood, if they shift from natural resource use inside the Project Areas to outside the Project Areas. Nonetheless, the impact for communities outside of the Project Areas is expected to be minimal since several of the Project activities are specifically designed to create alternatives to resource extraction and improve livelihoods. For example, there are a set of Project activities that focus on creating alternative sources of fuelwood through agroforestry, interventions, including interplanting trees with crops that increase yields (e.g. *Faidherbia albida*) and establishing and maintaining village-level nurseries surrounding the protected areas. .

In addition, in the first four years of the Project, woodlots were planted in communal village areas to produce fuelwood. Similarly, the management of existing woodlands will be improved through workshops and capacity building sessions. The effects on the protected forest areas from a reduction in fuelwood collection due to the existence of woodlots and woodlands is accounted for in the REDD+ Project.

Often deforestation is carried out by local community members out of necessity. By providing alternative forest-based incomes to local communities, through the development of local enterprises deforestation activities should discontinue and not just shift to another location.

2.5.2 Offsite Impact Mitigation Strategies

It is anticipated that the livelihoods of certain members of the populations near the protected areas will not be negatively affected by the Project. Specifically, community members in the Project Zones who are subsisting on illegal land-use activities, such as hunting and conversion of land inside the Project Areas, will find alternative livelihoods through the implementation of local enterprises, such as honey, coffee, macadamia and livestock.

The Project intends to monitor any unintended activity-shifting leakage in a leakage belt surrounding the Project Areas to account for any negative environmental impacts. To the extent possible, hunters, migrants and other agents of deforestation that are shifting their illegal land-use practices outside of the Project Areas will be engaged by the Project team and assisted in developing alternative land-use practices and livelihoods. Employment opportunities will be presented to avoid excluding these agents of deforestation from the Project and the DNPW and NVA officials will work with the other Project implementation partners to educate these agents about the benefits of the Project.

2.5.3 Demonstration that the Project will Not Negatively Impact the Well-Being of Other Stakeholder Groups

The Project is designed to minimize any negative offsite impact. By building and empowering community institutions to manage and conserve local forests and creating employment and livelihood opportunities, the Project will have little negative offsite impacts. The Project will include neighbouring communities living outside the Project Areas, but within the Project Zones, in its socio-economic monitoring activities. In addition, measures are in place to minimize any negative effects to communities living outside the Project Zones. For example, TLC would also respond to queries and problems related to the Project that may arise in neighbouring non-Project communities.

2.6 Community Impact Monitoring

The methodology will feature periodic social assessment consisting of household surveys to measure the quantitative impacts on local communities and PRAs to measure the qualitative impacts against the baseline. Whereas the household survey is semi-structured and will canvass a stratified randomized sample of community members in the Project Zones (participants and non-participants alike) based on socio-economic and geographic variables, the participatory rural appraisals and focus groups provide a targeted, purposive sample of Project participants. Using an open-ended, participatory approach, the participatory rural appraisals and the focus groups also provide the opportunity for an in-depth exploration of issues relevant to community members.For additional details, the Standard Operating Procedures used to create the household surveys and PRAs can be provided to the Validators.

In addition, TLC has drafted a Performance Monitoring Plan (PMP) and will continually track progress against performance indicators. The next stage in this process will be to fully involve local communities in developing their own articulation of indicators to track community impacts, the results of which will be integrated in the overall monitoring plan. The monitoring methodology is participatory in that Project participants including Project proponents (TLC and TGC), local partners (NVA, NAWIRA), and government authorities (the DNPW) have all provided input into the design, planning, and initial implementation of the monitoring plan.

2.6.1 Selecting Community Variables to be monitored

The Project communities will be involved in an annual participatory monitoring exercise to assess the extent to which Project activities are achieving the community and Project goals. The following aspects will be monitored:

- social indicators;

- economic indicators;
- institutional indicators;
- biodiversity indicators;
- carbon stocks and forest condition.

All methods will rely on community input regarding Project impacts. Parameters to be measured will include:

- community member knowledge, attitudes, and behaviors related to the Project, especially levels of participation;
- changes to forest related income and employment;
- institutional capacity to manage natural resources and finances;
- improvements in forest habitat and sighting frequency for indicator species;
- changes in carbon stock levels and forest conditions.

Data will be collected through community focus group discussions, in-depth interviews, and sample surveys. This annual participatory assessment will be supplemented by field trip reports and the minutes of meetings facilitated by the local NGO support group. Longer term measurement of the impact of the Project on local communities will be gathered through periodic sample surveys conducted with Project families. These surveys will cover a range of issues including income, land tenure, and employment, education, social capital, and resource availability and will be used to quantitatively measure socio-economic changes in the Project communities.

A copy of the draft performance monitoring plan for the Project, which contains a detailed description of the community variables to be surveyed, has been developed (See ANNEX I: Performance Monitoring Plan)

This monitoring plan will be finalized within 6 months after validation.

2.6.2 Assessing Effectiveness of High Conservation Value Monitoring

Special attention will be given to HCV areas specific to meeting community needs, including areas with *dambwe* (shrines for the spiritual masked society known as the *Nyau* or *Gule Wamkulu*), and sacred groves protecting grave yards and burial sites. Data on HCV areas will be collected through community focus group discussions, in-depth interviews, and field surveys within the HCV area. The effectiveness will be assessed by HCV areas not being negatively affected by Project implementation over time and further monitored by reviewing interviews of community members over time.

2.6.3 Commitment to Develop Full Monitoring Plan

A full community impact monitoring plan has been developed (see ANNEX I: Performance Monitoring Plan) Within twelve months of validation this plan will be adopted to ensure that data captured is consistent with past experience and in collaboration with the DNPW and Community Associations. Participatory trainings on Project monitoring will be conducted through TLC's extension services and the DNPW with all the Project communities in order to build local capacity for monitoring. The results of monitoring will be made publically available and posted on the Project website.

3 BIODIVERSITY SECTION

3.1 Net Positive Biodiversity Impacts

3.1.1 Methodologies Used to Estimate Changes in Biodiversity

The proposed participatory biodiversity monitoring methodology draws on the systems articulated by Finn Danielsen *et al.(2000)* This simple system was selected because it not only provides a cost-effective, field-based monitoring system, but it also creates a sense of ownership among resident people over the biological resources and their conservation. The main elements of the biodiversity monitoring system include:

- standardized recording of routine observations;
- fixed point photography;
- line transect surveys;
- focus group discussions.

Several key indicator species will be selected and monitored to track the impact of Project activities in comparison to the baseline. At least one of these indicator species will be a species which has a market value and is commonly traded, thus indicating the human-wildlife dynamic as it evolves.

In the without-Project scenario forest cover is expected to continually decrease causing a loss of biodiversity, quantity of species present, and quality of forest ecosystems. Under the with-Project scenario forest cover will increase and forest ecosystems will be enhanced. Native species to the Project Areas are expected to flourish with the Project. Overall the Project will have a net positive benefit to biodiversity in the Project Areas. As many species will move between the protected areas, community woodlots in the Project Areas, and other village forest areas, biodiversity is expected to increase in the Reference Region with Project implementation as well.

3.1.2 Demonstration that No High Conservation Value (HCV) Areas will be Negatively Affected

Since the goal of the Project is to enhance and protect forest resources, areas that are of HCV will not be negatively affected. These areas of special environmental, biological, and rare ecosystem significance are expected to flourish throughout and beyond the life of the Project.

Without the Project, these areas of special biodiversity value are expected to decrease with the loss of forest cover due to continued encroachment and continued poaching of species within the protected areas.

3.1.3 Identification of All Species to be Used by the Project and No Known Invasive Species Will be Introduced into Any Area Affected by the Project

No invasive species will be used and the use of exotic species will be limited.. The most common species do well in the Project Areas and shall be promoted include:

- Bamboo
- Acacia albida
- Senna spectabilis
- Faidherbia albida (msangu)Senna siamea
- Albizia lebbeck (Mtangatanga)
- Accacia polyacantha(Mthethe)
- Acacia galpini (Mkunkhu)
- Afzelia quanzensis (Msambafumu)

None of these tree species are invasive and they are mostly indigenous to the area. Generally, the trees shall be planted either around homestead or communal village forestry areas to help households meet their domestic, economic and environmental demands. Most importantly, the Project will encourage tree regeneration of the existing local species which tend to grow fast because they already have well established root base. With proper management, tree regeneration also produces good poles and are a reliable source of fuelwood for the local communities.

3.1.4 Possible Adverse Effects of Non-Native Species Used by the Project

The tree species listed above have been the common tree species that were promoted under the Project. These are the same trees that will be promoted in the community under the REDD Project. There are no known adverse effects for these trees species on the environment as these are mostly indigenous to the local environment.

3.1.5 Guarantee that No Genetically Modified Organisms (GMO) will be used in the Project

No genetically modified organisms are included in this Project design and that no genetically modified trees shall be planted under the Project. In addition, agricultural interventions under the Project will also avoid purchase of genetically modified organisms, and this requirement will also be specified in any sub-contracts with technical support or extension agencies.

Genetically modified organisms are becoming more common for a source of seed, fast growing trees, and livestock feed all over the world, and Malawi is no exception. Though we can guarantee that the Project will not use any genetically modified organisms we cannot regulate the flow of community resources such as feedstock, and foods such as rice or other grain use in and out of the Project Areas.

3.2 Offsite Biodiversity Impacts

3.2.1 Identification of Potential Negative Offsite Project Impacts

Since the Project will also support the DNPW and Associations in restricting hunting and fire in the Project Areas, the Project may displace some pressure from hunting or NTFP gathering pressures to areas outside of the Project Areas. These impacts will be monitored within the Leakage Belt surrounding the Project Areas. However, concomitant with the overwhelmingly positive climate impacts of the Project Areas, the net biodiversity impact of the Project will be undoubtedly positive.

3.2.2 Mitigation Strategies for Negative Offsite Biodiversity Impacts

Significant negative offsite biodiversity impacts are not anticipated. However, to the extent that some negative impacts do occur (e.g. displacement of hunting pressure to areas outside of the Project Areas) strategies have been developed to monitor and mitigate these impacts. The participatory biodiversity monitoring system will document all flora and fauna and their uses. Species that are reported to be scarce may receive special protection or harvesting regulations based on these findings. Sustainable harvesting methods for NTFPs will be included as part of a capacity building and livelihood program both within the Project Areas and in the Leakage Belt to mitigate the negative impacts of displaced NTFP collection. Members of communities within the Project Zones will be integrated into Project's support for development of rural enterprises through the promotion of ecotourism activities and the production, processing and marketing of sustainably produced non-timber forest products (e.g. honey, coffee, macadamia). members of the community who are involved in hunting and/or illegal wood extraction (for fuelwood, charcoal, etc) will be encouraged to find alternative sources of livelihoods and sensitized to the benefits of production of NTFPs. Ongoing biodiversity monitoring and periodic assessments and education work will aim to change behavior with regards to hunting through awareness raising.

Finally, there will be increased efforts for communities to engage in participatory forest protection. These efforts will include training for protected area and Community Association officials in community mobilization, participatory law enforcement, etc. and improved communications between communities and law enforcement. All of these efforts will help to mitigate any potential negative impacts to biodiversity.

3.2.3 Unmitigated Negative Off-site Biodiversity Impacts

No major unmitigated impacts on biodiversity are anticipated due to the Project emphasis on community-based habitat restoration and the support program for biodiversity conservation. The benefits greatly outweigh any negative biodiversity impact.

3.3 Biodiversity Impact Monitoring

3.3.1 Biodiversity Monitoring Plan

The main areas of biological significance are located within the boundaries of the protected areas. As such, biodiversity the DNPW will monitor biodiversity in the Project Areas which fall inside the boundaries of the protected areas. Project level indicators were developed as baseline to measure improved

biophysical conditions as a result of the Project. Specific measurements for the Project-level indicators included:

- Woody and herbaceous vegetation
- Water quantity and sediment loads in key rivers and streams
- Bulk Density or Organic Matter in Soil
- Wildlife Inventories

Based on the Kulera Biodiversity Project Performance and Evaluation Plan, biophysical Project-level indicators will be used to monitor "Project Result Number 1: Improved Governance of Protected Areas" (Appendix 1). The following Project performance indicators will be incorporated into the biodiversity monitoring plan:

Indicator 1: Number of hectares in protected areas showing improved biophysical conditions.

For this indicator, performance is measured by number of hectares showing improved biophysical conditions where 'improved bio-physical conditions' means stability, improvement or slowing the rate of decline in one or more selected biodiversity parameters over time such as wildlife populations.

The selected biodiversity parameters that will be used to measure improved conditions for indicator this indicator are:

- percentage of woody species
- percentage of herbaceous species
- vegetation
- age structures as DBH classes
- canopy cover percentage
- number of observed mammal wildlife species
- water quantity and sediment loads in key rivers and streams.

Indicator 2: Number of hectares in areas of biological significance under improved management.

This indicator includes activities that promote enhanced management of natural resources for the objective of conserving biodiversity in protected areas. These activities include:

- Ongoing efforts by the DNPW and NVA to encourage communities to turn in illegal guns and wire snares used for illegal hunting
- Efforts by Project partners to enhance community understanding of the importance of biological diversity and conservation
- Efforts to strengthen governance structures within each Natural Resource Use Zones
- Demarcation of the protected area boundaries by communities
- Strengthening existing NRC's in Nyika and Vwaza, and facilitating the creation of new NRCs in Nkhotakota

Indicator 3: Number of hectares of natural resources showing improved biophysical conditions.

For this indicator, performance is measured by number of hectares showing improved biophysical conditions where 'improved bio-physical conditions' means increase in reforestation, and a decrease in poaching rates or illegal activities. Based on baseline bio-physical inventory data, the number of illegal activities recorded per protected area will be used as an indicator for improved bio-physical conditions(Mawaya 2011). In addition, poached animals and the number of poachers' bases recorded by the DNPW will be used as baseline and monitoring indicators.

Indicator 4: Number of hectares under improved natural resource management

For this indicator, performance is measured by number of hectares of natural resources showing improved natural resource management where 'improved natural resource management' includes

activities that promote enhanced management of natural resources for one or more objectives e.g. woodland management, promoting sustainable agriculture. The baseline physical parameters that will be used to measure promotion of enhanced management of natural resources are: soil bulk density; soil organic carbon and soil erosion. It is envisaged that Project interventions such as promotion of conservation and sustainable agricultural activities will improve the soil condition parameters in the Project impact areas. The direction of change as a result of Project interventions should be: decrease in soil bulk density values; increase in percentage of organic carbon; and decrease in soil erosion.

In addition, the Project assumption that improved livelihoods, increased incomes and other cross cutting initiatives such as carbon development and trading will act as incentives for sustainable management of natural resources inside and outside protected areas were also taken into account in choosing the indicators. Other factors that have been taken into account to come up with the proposed indicator parameters include: baseline bio-physical inventory data results; choosing indicators that can be easily monitored and can show changes within a short-term like a year since the Project only runs for 3 years; data that can easily be collected during monitoring and by government agencies as part of their management information system (especially for wildlife monitoring indicators); indicators that will also improve the skills of agencies (parks and wildlife and forestry) and their monitoring units). Finally, issues of accessibility into the protected areas (due to lack of maintained access roads and bridges especially in Nyika National Park and Nkhotakota Wildlife Reserve and the rugged terrain in these two protected areas) have also been taken into account (Mawaya, 2011)[ii].

The assumption of the Project is that improving rural livelihoods and NRM practices; and increasing rural incomes from enterprise initiatives will in turn contribute towards improved governance of protected areas. Therefore, communities, once their livelihoods are improved and their rural incomes are increased; are expected to improve conditions inside the 10 km Project Zones due to reduced pressure from unsustainable natural resource exploitation patterns and behaviors (Mawaya, 2011)[ii].

As an example of monitoring, in terms of area, the number of plots that show improved conditions during monitoring will be compared against those plots that do not show any improved conditions. The condition of the sample plots have been classified from 1-5 based on the following conditions:

Class 1: <10% ground cover, >10% seedlings and saplings, <10% trees with dbh<5cm, Vegetation cover lost, bare soil widespread. Represents a plot with young trees, probably under pressure from deforestation or fire

Class 2: <10% ground cover, >25% seedlings and saplings, >25% trees with dbh<5cm, Slight loss of vegetation cover and minimal disturbance of organic litter. Represents a plot with young to medium trees under regeneration

Class 3: >10-50% ground cover, 50% seedlings and saplings, >50% trees with dbh<5cm, Slight loss of vegetation cover and minimal disturbance of organic litter. Represents a plot with medium trees and some under regeneration

Class 4: >50-75% ground cover, <25% seedlings and saplings, >50% trees with dbh<5cm,Slight loss of vegetation cover and minimal disturbance of organic litter. Represents a plot with medium and mature trees

Class 5: >75-100% ground cover, <10% seedlings and saplings, >75% trees with dbh<5cm, no or minimal disturbance of vegetation and organic litter. Represents a mature stand and no pressure

A copy of the full draft biodiversity monitoring plan which contains a detailed description of the specific variables to be surveyed will be made available to the verifier. This monitoring plan will be finalized within 6 months after validation.

3.3.2 Assessment of the Monitoring Plan Effectiveness

The Project intends to rely on community participation for monitoring biodiversity and High Conservation Value (HCV) areas in the Project Areas, with support and technical consultation from a locally-based agency. Community members will be tasked with monitoring a number of biodiversity indicators to track the effectiveness of habitat conservation measures. These include the following:

- changes in number of sightings of designated species or resource use;
- changes in size of vegetation type blocks;
- changes in frequency of detection of designated fauna species along established transects;
- changes in perceived harvest volume per effort.

The indicators are designed to focus on trends in biodiversity and habitat quality. Special attention will be given to High Conservation Value areas, based on community and team discussion of the monitoring results, each year the VNRMCs and Project implementers will identify any additional actions that need to be taken and integrated into the coming annual work plan.

3.3.3 Commitment to Develop Full Monitoring Plan Within Twelve Months of Validation

A full biodiversity monitoring plan will be developed by the implementing partner, TLC in collaboration with the DNPW, within 12 months of validation. The results of monitoring will be made publically available on the internet. Communication to local communities and stakeholders will be consistent to that described in Section 0 and will be made available in local or regional languages when relevant.

4   GOLD LEVEL SECTION

4.1   Climate Change Adaptation Benefits

4.1.1   Identification and Mitigation of Likely Regional Climate Change and Climate Variability Scenarios and Impacts

Malawi has experienced a number of adverse climatic hazards over the last several decades. The most serious have been dry spells, seasonal droughts, intense rainfall, riverine floods and flash floods. Some of these, especially droughts and floods, have increased in frequency, intensity and magnitude over the last two decades, and have adversely impacted on food and water security, water quality, energy and the sustainable livelihoods of rural communities (Ministry of Mines, Natural Resources and Environment March 2006).The areas at highest risk of droughts and floods include those in the Project Zones (Figure 31).

According to Malawi's National Adaptation Programme of Action, the sector that will be most severely impacted by climate change is agriculture. Over 50 percent of the population lives below the poverty line and one in five people is chronically food insecure. Rainfed agriculture is the main livelihood of 85 percent of the population, leaving them highly vulnerable to weather shocks such as erratic rainfall that can cause flooding and periodic droughts that affect the country (Global Facility for Disaster Reduction and Recovery April 2011).

Agriculture is mostly rain-fed, and the current droughts have resulted in poor crop yields or total crop failure, leading to serious food shortages, hunger and malnutrition. Flooding has also severely disrupted food production in several districts of the country. The most vulnerable groups are rural communities, especially women, children, female-headed households and the elderly (Ministry of Mines, Natural Resources and Environment March 2006).

Specifically, floods cause annual losses of about 12 percent of maize production in the south, where about one-third of Malawi's maize is grown (Human Development Report 2007) Models estimate that floods may cause an average GDP loss of almost 1 percent every year, while during periods of drought, economic losses are found to be much higher. For example, during a 1-in-25 year drought, as was the drought that struck Malawi in 1991/92, GDP can contract by as much as 10.4 percent. Drought destroys on average 4.6 percent of the maize production each year in Malawi (based on today's adoption of different varieties) (Global Facility for Disaster Reduction and Recovery April 2011).

Droughts have been observed to increase poverty by 1.3 percentage points, but this rises to almost 17 percentage points during a 1-in-25 year drought (roughly equal to an additional 2.1 million people falling below the poverty line). Children, the elderly, and female-headed households tend to suffer the most from droughts through malnutrition and consequential high susceptibility to diseases. In addition, livestock and wild animals are adversely affected by drought (Global Facility for Disaster Reduction and Recovery April 2011).
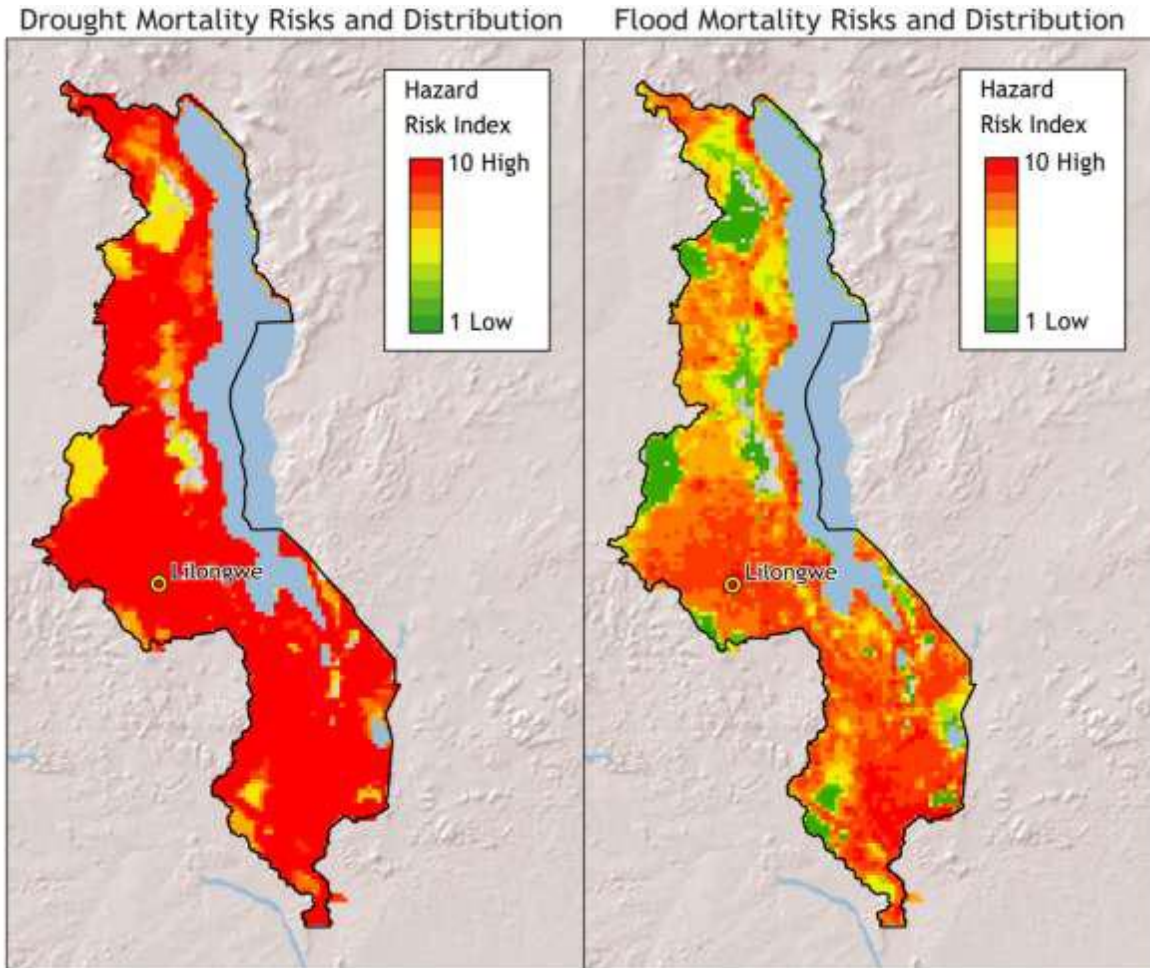
Figure 31. Exposure to Climate-Related Hazards across Malawi

Source This dataset is the result of collaboration among the Columbia University Center for Hazards and Risk Research (CHRR), International Bank for Reconstruction and Development/The World Bank, and Columbia University Center for International Earth Science Information Network (CIESIN)

In the absence of the Project, many households run the risk of being food insecure and experiencing increased levels of poverty which can only drive them into more destructive coping mechanisms that will eventually negatively impact on the protected areas. Some of the negative coping mechanisms that can impact negatively on the protected areas include poaching and deforestation as households search for alternative survival options. Deforestation leads to high rates of erosion that result in loss of soil fertility thereby affecting land productivity which contributing to low crop yield. This will drive the community into a vicious cycle of poverty and deprivation.

With this Project, the communities' resilience to climate change will be built through a number of climate smart related interventions such as promotion of Conservation Agriculture, integrating tree crops in the farm; promoting afforestation and tree regeneration; engaging in income generating opportunities and other livelihood support programmes as well as capacity building initiatives to increase community awareness on the risks of climate change and how they can manage the risks (i.e. through radio programmes and other mass media activities).

4.1.2   Identification and Mitigation of Any Risks to the Project's Climate, Community and Biodiversity Benefits

Though the Project is expected to conserve biodiversity, the effects of climate change on species are not completely known. The major climatic hazard that affects the wildlife sector is drought. Drought affects animal reproduction systems and migratory habits. For example, the 1979/80 drought resulted in the deaths of Nyala in Lengwe National Park in Chikwawa and the migration of most animals from the game reserve (Ministry of Mines, Natural Resources and Environment March 2006). The proposed mitigation measures include fire management in the Project Areas and Project Zones.

Droughts are threaten the forestry sector, causing land degradation and loss of soil fertility, as well as forest fires. For example, during the drought of 1995, some 5,550 ha (or 36%) of Chongoni forest were destroyed by forest fires caused by human activities such as hunting resulting in smoke haze, pollution, loss of seedlings and biodiversity (Ministry of Mines, Natural Resources and Environment March 2006).. The Project aims to mitigate these impacts by ensuring sustainable land and forest management, forest fire management, and well as monitoring for species that may be facing climate related challenges.

As noted above, climate change also threatens the most vulnerable and food insecure people in Malawi through its impacts on agriculture. In addition, the health sector in Malawi is directly affected by climate change, in particular by the increasing incidence of floods and droughts, which lead to infant malnutrition and chronic ailments associated with malaria, cholera, and diarrhea. Malaria alone is expected to increase and spread to previously cool zones as temperatures increase due to global change (Global Facility for Disaster Reduction and Recovery April 2011).

Activities planned in the Project are expected to provide a buffer against the above-mentioned risks to the Project's climate, communities and biodiversity benefits. These are also among the prioritized adaptation options contained in Malawi's National Adaptation Programme of Action (Ministry of Mines, Natural Resources and Environment March 2006):

- Improving crop production through climate smart agriculture;
- Targeting afforestation and re-afforestation programmes to control siltation and the provision of fuel wood, and for their benefits, such as sources of alternative cash income;
- Improving energy access and security in rural areas (e.g., through extension of energy-efficient stoves);
- Improving nutrition among rural communities (e.g. through the small livestock program and livelihood programs);
- Managing forest fires in collaboration with communities; and
- Strengthening entrepreneurial and business skills for income generation

4.1.3   Demonstration of Climate Change Impacts on Communities and/or Biodiversity

The farmers within the Project Zones depend on rainfed crops, and extended droughts present the biggest problems to these communities. Farmers are already affected by drought and continuing climate change will exacerbate these conditions. Bushfire frequency and intensity is expected to increase with droughts, and will also greatly affect communities. Increased bush fire will destroy forest, and associated products derived from forests, that communities rely on for their livelihoods (e.g. honey production

Without the Project, the anticipated deforestation of the area coupled with an increase in seasonal flooding and droughts will result in widespread erosion that decreases soil fertility and accelerates the sedimentation of nearby rivers, thereby also affecting other aquatic life.

4.1.4   Demonstration that Project Activities Assist Communities and/or Biodiversity to Adapt to Climate Change

In order to cope with climate change, the Project has built the capacity of farmers for adaptation to climate change through training and provision of other resource inputs. Adoption of climate smart agriculture and natural resources management is helping farmers increase and stabilize crop yields thereby ensuring

household food security. Any surplus production will be sold to generate income. Other benefits that will come with adoption of climate smart practices like Conservation Agriculture include improved health of the soils, reduced water runoff and loss of top soil, reduced farm labour requirements which will lead to increased crop yields.

Through low cost systems of winter irrigation, such as stream diversion, treadle pumps, water harvesting, and drip irrigation, farmers will be able to produce enough food for their households and shall also help the farmers generate income through other high value crop production. This will reduce dependency on the normal rain-fed crop the reliability of which is subject to unpredictable weather patterns. Farmers will also be taught to diversify their farming using improved crops and varieties with high yielding, disease-resistant, drought-tolerant characteristics adapted to the local agro-ecology. Support the production of coffee, macadamia and citrus to replace annual crops in selected highland areas to increase incomes with the added conservation benefits of reduced runoff and erosion. Small stock livestock shall also be promoted to increase incomes and animal protein in the diet with a focus on poultry and goats.

This strategy of adaptation will be complemented by tree planting, promoting the regeneration of natural woodlands in demarcated communal areas to restore the biodiversity of the landscape with the potential to harvest multiple products under sustainable management plans and use of fuel-efficient cook-stoves to mitigate the impacts of climate change by reducing deforestation and carbon gas emissions.

Through these interventions, the community will enjoy the benefits of well-managed landscapes that contribute to high water infiltration and lead to more green water, thus easing the pressure of water access for both animals and humans, which is normally associated with climate change shocks, especially droughts

4.2 Exceptional Community Benefits

4.2.1 Demonstration that the Project Zones are in a Low Human Development Country

According to the United Nations Development Programme's Human Development Report 2013, Malawi's HDI value for 2012 is 0.418 in the low human development category, positioning the country at 170 out of 187 countries and territories. Table 16 below shows Malawi's progress towards each of the HDI indicators, between 1980 and 2012.

Table 16. Malawi's HDI Trends

	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2005 PPP$)	HDI value
1980	44.4	4.8	1.8	0,628	0.272
1985	46.1	4.6	2.1	0,617	0.283
1990	47.1	5.2	2.5	0,554	0.295
1995	46.7	7.5	2.7	0,602	0.322
2000	46	11	3	0,654	0.352
2005	49	9.7	3.4	0,640	0.363
2010	53.5	10.4	4.2	0,775	0.413
2011	54.2	10.4	4.2	0,763	0.415
2012	54.8	10.4	4.2	0,774	0.418

Additionally, according to the Human Development Index, 73.9 percent of Malawi's population is living below USD1.25 per day (United Nations Development Programme 2012). According to the baseline survey for the Project, farming was the most significant source of income for the households around the protected areas. On average, the total annual income per household found to be around MK 68,000.00 which is equivalent to US USD 272 at exchange rate of MK 250= 1 USD as of that time, representing 0.72 USD per day.

4.2.2 Demonstration that the Poorest Communities will Benefit from the Project

The poor households in the Project Zones rely on forest products and agricultural land as their sole source of income. The Project is creating alternative livelihoods for all of the households in the 10 km zones surrounding the protected areas.

Specific "poor" households have been identified through a participatory rural appraisal (PRA) and beneficiaries targeted. A Standard Operating Procedure (SOP) detailing the procedures and objectives for implementing the PRA with communities involved, was used and can be provided to the Validators. It was specifically noted that underrepresented groups, including the very poor, be present for the appraisal.

Once implemented the PRA provided the information necessary to identify which households were the poorest within the targeted communities. Specifically, the PRA undertook a wealth ranking or welfare ranking exercise. Using subjective criteria, acceptable to all the participants (e.g. number of livestock, size of house, amount of land, other income, trade associations, salaries, etc), the participants estimated the wealth ranking of households in the community. The participants answered the questions in terms of the percentage of a particular community that ranked as Rich, Average, and Poor. For any community that had more than 20 percent of households in a particular ranking, that class was further subdivided until all classes had 20 percent or less in a single class.

This process allowed the Project team to identify, at a granular level, which villages are among the poorest of the poor as well as to understand their particular vulnerabilities. For example, at the first level a certain percentage of the village might be identified as poor because they only have a grass thatched roof; within that group a certain percentage might be identified as very poor because they only have food to last 10 months. The results of the PRA are being used identify those beneficiaries that are in the lowest category of well-being and the most in need of support from the Project. The resulting research (i.e. data sheets) can be provided to the Validators.

Given that many households are directly or indirectly affected by HIV/AIDs, the Project also aims to ensure that interventions encompass opportunities to target these households. Special efforts are being made to target households engaged in illegal exploitation of reserve resources with the aim to understand and address this behavior by providing alternative options.

In addition, programmes such as the small scale livestock program deliberately target resource poor households with no history of livestock access but with means to raise and manage the resource. Furthermore, through the Associations, Project funds will also target other development initiatives with the resource poor in mind. Interventions such as improvement of health clinics, improved water access will be supported as they tend to promote the welfare of the poor.

Monitoring will ensure the Project benefits are accruing effectively to poorer households, and that these benefits are having a meaningful effect on the socio-economic wellbeing of this population. Indicators will be developed in the monitoring plan to track these improvements in well-being among poor households, and Project activities can be tailored based on this information to ensure maximum effectiveness. The goal of this effort is to ensure that at least 50% of the poorer communities are substantially benefiting from the Project, and that ultimately these households can be raised out of the poor category through the direct intervention of the Project.

4.2.3 Demonstration that Poor or More Vulnerable Households will not be Negatively Affected

The Project has identified poorer households through social surveys and participatory rural appraisal (PRA) exercises. Any barriers or risks that may prevent benefits from going to the poorer households will be identified after validation and verification, when a benefits distribution mechanism is operational. The benefits distribution policy will be drafted by the DNPW and Associations, adopted by the Public Private Partnership Entity. If any barriers are identified, and funds/revenues are available for the full implementation of Project activities, the governing body of the Public Private Partnership Entity which includes the Association heads shall work to ensure that at least 50% of households within the lowest

category of well-being (e.g., poorest quartile) of the community are encouraged and enabled to participate in Project activities.

Once these barriers are identified, the implementing partners, as part of the monitoring program, will engage in consultation with poor and vulnerable households. This monitoring, combined with household surveys aimed at assessing the impact of Project activities, will allow the implementing partners to tailor Project benefits to households that would otherwise face barriers in receiving these benefits. For example, illiterate households will receive training that does not require literacy – i.e. agricultural intensification.

Monitoring will also include on-going dialogue with vulnerable households to determine if Project benefits are being distributed across socio-economic classes. Every effort will be made to identify and negate any negative impacts on vulnerable households that may arise. In cases of unavoidable negative impacts on vulnerable households and individuals, specific workshops will be held amongst Association leaders to identify activities and programs that may solve these issues. Wherever possible, the advice and desires of vulnerable households and individuals will be prioritized and used as a basis for ongoing decision making.

Additionally, ongoing consultations between TLC and Association leadership will provide valuable insights into the effect that the Project is having on the livelihoods of households in the Project Zones, including poor households as well as women.

Furthermore, the Project will work with Association leaders to identify members (Lead Farmers or Community Extension Workers) who will receive training in the relevant areas and may receive some associated incentives depending on the type of activities they engage in. Special attention will be given to ensuring that the capacity building opportunities are shared fairly among the community and that disadvantaged households, especially the poorest community members, receive special attention.

4.2.4 Demonstration that Disadvantaged Groups will not be Negatively Affected

Particularly disadvantaged groups, including poorer or more vulnerable households, often become associated with jobs that pose greater risks – such as bush fire prevention and control. While these risks are difficult to control in their entirety the Project implementers are developing Worker Safety Guidelines aimed at minimized these risks. Training will be providing to all community members, through the Associations and VNRMCs, and special attention will be given to ensure that any risks associated with Project implementation are well understood.

4.2.5 Community Monitoring of Disadvantaged Groups

A periodic social assessment will be conducted every 2 years. The social assessment will consist of a household survey administered to a representative sample of households in the Project Zones and a series of PRAs and focus group discussions shall be conducted at Area Development Committee level in all Project sites to determine the drivers and social impacts of the various Project interventions, especially on the poor. At least 30 participants at each site will actively participate in these focus group discussions involving both ordinary community members as well as local leaders and extension staff.

These household surveys and PRAs will be inclusive in that they will focus on both more-advantaged as well as vulnerable and disadvantaged groups in order to ensure that the broadest social spectrum of households are being monitored and their inputs recorded. The same methods described above (Section

Household listing for each active village under the Project was captured and a list of poorer and vulnerable households have been initially identified and a database of these households will be maintained and updated, informed by ongoing social monitoring activity.

VNRMCs will include representative samples of poorer and vulnerable households in from each village to ensure that the views of these groups are included. This will also ensure that Project benefits are not only accruing to elites or more advantaged members of each VNRMC.

Annual gender assessments to determine how benefits are accruing to women will also be carried out. A results-based framework outlining the required steps to improve and monitor the participation and benefits of women has been devised and carried out by the Project. The findings from this initial assessment will be used to devise key indicators to monitor gender-specific impacts and these indicators and a gender-specific monitoring plan will be incorporated into the montoring framework within 6-months of validation. Social monitoring will also be conducted by hosting scholars from external research institutions and through the implementation of a participatory monitoring system which actively involves community members in Project monitoring.

During the participatory rural appraisal process, focus groups will also be conducted with community members to identify Project impacts. Using a qualitative as well as quantitative approach, focus groups will be exploratory and focused on documenting the impacts of the Project on community members from their perspective. The results of the PRA and focus groups will be analyzed together with the household survey to identify social impacts as a result of the Project. Poor and vulnerable groups will be identified by disaggregating respondents according to geographical location. Meanwhile, variables such as employment status and NTFP usage (an indicator of forest dependence and socio-economic vulnerability) will be monitored over time through longitudinal analysis of household survey and participatory rural appraisal results. A list of community variables that will be monitored can be found in ANNEX I: Performance Monitoring Plan.

4.3   Exceptional Biodiversity Benefits

4.3.1   Demonstration of High Biodiversity Conservation Priority through the Vulnerability Criterion

Through Project implementation the endangered and vulnerable species will be protected and populations enhanced.

Endangered and Vulnerable Species in Nyika National Park

Several bird species found in Nyika National Park are considered vulnerable, including the blue swallow (*Hirundo atrocaerulea*), wattled crane (*Grus carunculatus*), and chirring cisticola. (Nyika-Vwaza Trust 2011).

In addition occasional vagrant populations of the endangered African Wild Dog (*Lycaon pictus)* can be found in the Project Zones, around the border of the protected area (although no resident population exists there). Endangered African Elephants (*Loxodonta Africana*) are also occasional in the protected area (Environmental Affairs Department 2010).

Endangered and Vulnerable Species in Vwaza Marsh Wildlife Reserve

One bird species found in Vwaza is considered vulnerable: wattled crane (*Grus carunculatus*). The mammal species considered vulnerable include Lion (*Panthera leo*), Hippopotamus (*Hippopotamus amphibius)* (Environmental Affairs Department 2010).

Endangered African Elephants (*Loxodonta Africana*) as well as African Wild Dog (*Lycaon pictus)* are also occasional in the protected area (Environmental Affairs Department 2010)..

Several species are uncommon elsewhere in Malawi, including Swainson's francolin, Souza's shrike, pale billed hornbill, and racket-tailed roller (Department of National Parks and Wildlife 2004b).

Endangered and Vulnerable Species in Nkhotakota Wildlife Reserve

Lion (*Panthera leo*) and African Elephants (*Loxodonta Africana*) are also found in Nkhotakota Wildlife Reserve (Environmental Affairs Department 2010). Lake salmon (*Opsoridium microlepis*), a species endemic to Malawi, is also endangered.

REFERENCES

Bunderson, W. Trent, D. Jere Swide, Haig Sawasawa and Paul Garside, Steve Sakama, R Museka,Kamwanya, P Phiri, L Malwanda, V Kaitano, Diane Gooch, Bouke Bilj, Rasheed. 2008. Chia Lagoon Watershed Management Project. Volume I: Technical and Financial Report. Chia Partner Alliance. USAID Malawi and Washington State University.

Danielsen, Finn *et al.* 2000. "A simple system for monitoring biodiversity in protected areas of a developing country" Biodiversity and Conservation (9:1671-1705).

Department of National Parks and Wildlife, Malawi Government, 2004a. Nyika National Park Master plan 2003

Department of National Parks and Wildlife, Malawi Government, 2004b. Vwaza Marsh Wildlife reserve master plan 2003.

Environmental Affairs Department. March 2006. Malawi's National Adaptation Programmes of Action (NAPA). Under the United Nations Framework Convention on Climate Change (UNFCCC). First Edition.

Environmental Affairs Department. June 2010. Malawi Fourth Country Report to the Convention on Biological Diversity (CBD).

FAO 2010. Forest Resource Assessment of Malawi. Food and Agriculture Organization of the United Nations. Available at http://www.fao.org/docrep/013/al557E/al557E.pdf

FGLG. 2008. *Making community based forest management work.* Forest Governance Learning Group, Malawi Policy Brief No. 3. International Institute for Environment and Development, London. http://www.iied.org/pubs/display.php?o=G02357 (accessed June 7, 2010)

Foli, E.G., Makungwa, S. 2011. Enhancing Adaptation of Forests and People in Africa: Development of Pilot Cases for Selected Forest Ecosystems in Ghana and Malawi. In: Kleine, M. (Ed). FORNESSA/IUFRO-SPDC, Vienna, May 2011. 68 pp.

Global Facility for Disaster Reduction and Recovery. Climate Change and Adaptation Country Profile. April 2011.

Human Development Report 2007. National Adaptation Strategy to Climate Change Impacts, a case study of Malawi.

IUCN 2012. IUCN Red List of Threatened Species. Retrieved from: http://www.iucnredlist.org/

Johnson S. A. (1989). A Visitors Guide to Nyika National Park, Malawi, Blantyre Print and Packaging

Kainja, Sam. December 2000. Forestry Outlook Study for Malawi.

Malawi Law Society. 2012. Customary Land Bill. From *http://www.malawilii.org/node/4769*

Mawaya Ch, Chikuni, M, Chimphamba, J Dulanya, Z. (2011). Bio Physical Inventory for the Kulera Biodiversity Project. Final Copy: Volume I. Total Land care Malawi

Mauambeta D.D.C., Mwale C., and Ndovi W. (2010). *Status of Wildlife management in Malawi*.

McCracken, John. 2012. A History of Malawi, 1859-1966. Boydell & Brewer, Ltd. .

McShane, T.O. 1985. *Vwaza Marsh Game Reserve, a Baseline Ecological Survey.* Lilongwe, Department of National Parks and Wildlife.

Menon, Roshni. 2007. Human Development Report 2007/2008. Famine in Malawi: Causes and Consequences. Retrieved from: http://hdr.undp.org/en/reports/global/hdr2007-8/papers/Menon_Roshni_2007a_Malawi.pdf

Mill T.A. (1979). Resource Inventory and Management Plan for Nyika National Park, Malawi. Department of National Parks, Lilongwe.

Ministry of Lands and Natural Resources. 2008. *Malawi Growth and Development Strategy Addendum: Climate Change.* Lilongwe, Malawi: The Government of Malawi

Ministry of Mines, Natural Resources and Environment. Malawi's National Adaptation Programmes of Action (NAPA). March 2006

National Statistical Office 2008, Retrieved from: http://www.nsomalawi.mw/images/stories/data_on_line/demography/census_2008/Main%20Report/Census%20Main%20Report.pdf

Nkawihe, Maurice. June 2013. "Malawi Chiefs Gang up Against Customary Land Bill," in Nyasa Times, June 26 2013.

Nyika-Vwaza Trust 2011. *Nyika national Park Fauna and Flora*. Unpublished

Phiri, A., Mapemba, L., and Sopo, M. June 2011. Socioeconomic Baseline Inventory for the Kulera Biodiversity Project. Bunda College of Agriculture, Department of Agricultural & Applied Economics.

Rough J.L (1989). *Malawi's National Parks and Game Reserves*. The Wildlife Society of Malawi. Blantyre.

Sheridan, M. and C. Nyamweru. 2008. *African Sacred Groves: Ecological Dynamics and Social Change* (1st Edition). Athens, OH: Ohio University Press.

Solomon *et al*, "Technical Summary", Box TS.1: Treatment of Uncertainties in the Working Group I Assessment, in IPCC AR4 WG1 2007.

Terra Global. October 2013. VCS VM0006, revised. Carbon Accounting for Mosaic and Landscape-Scale REDD Projects.

Tobin, R J and W I Knausenberger, 1998, "Dilemmas of Development: Burley Tobacco in Malawi." *Journal of South African Studies.* Vol.24 No.2, p. 407

Total Landcare Malawi, 2009. Technical proposal: Kulera Biodiversity Project submitted to USAID

UNDP 2009. Human Development Report 2009. Overcoming barriers: Human mobility and development. United Nations Development Programme, New York.

United Nations Development Program. 2012. International Human Development Indicators: Population Living Below $1.25 PPP Per Day. Retrieved from: http://hdrstats.undp.org/en/indicators/38906.html

United Nations, Educational, Scientific and Cultural Organization (UNESCO). May 2000. Retrieved from: http://whc.unesco.org/en/tentativelists/1420/

United Nations, Educational, Scientific and Cultural Organization (UNESCO). February 2011. Retrieved from: http://whc.unesco.org/en/tentativelists/5605/

World Health Organization. 2010. Malawi: Flood Hazard Distribution Map. http://www.who-eatlas.org/africa/countries/malawi/malawi-flood-map.html

GLOSSARY

ADP	Agriculture Development Program
AFOLU	Agriculture, Forestry and Other Land Use
ANR	Assisted Natural Regeneration
AUMDD	Avoiding Unplanned Mosaic Deforestation and Degradation
BAR	Bare Ground
BRN	Burned land
C	Carbon
CCB	Climate, Community and Biodiversity Alliance
CDA	Children's Development Association
CDM	Clean Development Mechanism
CFE	Cookstove and Fuel Efficiency
CISANET	Civil Social Agricultural Network
CLD	Cloud
CO_2e	Carbon Dioxide Equivalent
DBH	Diameter at Breast Height
DEA	Director of Environmental Affairs
DEM	Digital Elevation Model
DF	Deforestation
DNA	Designated National Authority
DNPW	Department of National Parks and Wildlife
DTED	Digital Terrain Elevation Data
EIA	Environmental Impact Assessment
EMA	National Environmental Management Act
EVG	Evergreen
FAO	Food and Agriculture Organization
FR	Forest Reserve
GER	Gross Emission Reductions
GHG	Green House Gas
GIS	Geographic Information System
GLOVIS	Global Visualization Viewer
GOM	Government of Malawi
GPS	Global Positioning System
GRS	Grassland

GVH	Grouped Village Headman
ha	hectares
IPCC	Intergovernmental Panel on Climate Change
KBP	Kulera Biodiversity Project
km	kilometer
LCL	Lower Confidence Limit
LULC	Land Use / Land Cover
LULUCF	Land use, Land-Use Change, and Forestry
MACC	Management for Adaptation to Climate Change
MIO	Miombo
NAWIRA	Nkhotakota Wildlife Reserve Association
NED	National Elevation Dataset
NER	Net Emission Reductions
NGO	Non-Governmental Organization
NKK	Nkhotakota
NP	National Park
NRM	Natural Resource Management
(V)NRMC	(Village) Natural Resource Management Committee
NTFP	Non-Timber Forest Products
NV	Nyika-Vwaza
NVA	Nyika-Vwaza Association
PA	Protected Area
PD	Project Description
PRA	Participatory Rural Appraisal
QA/QC	Quality Assurance / Quality Control
REDD	Reduced Emissions from Deforestation and Degradation
RF	Reforestation
SHB	Shrubland
SHD	Shadow
SRTM	Shuttle Radar Topography Mission
TGC	Terra Global Capital
TLC	Total LandCare
TRI	Terrain Ruggedness Index
UCL	Upper Confidence Limit
UNDP	United Nations Development Program

USAID	United States Agency for International Development
USGS	United States Geological Survey
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
WTR	Water

ANNEX I: PERFORMANCE MONITORING PLAN

PERFORMANCE INDICATOR	INDICATOR DEFINITION AND UNIT OF MEASURE	SOURCE (S) OF DATA	METHOD/APPROACH OF DATA COLLECTION	SCHEDULE	RESPONSIBLE	METHOD OF DATA ANALYSIS	METHOD OF DATA USE
Strategic Objective: Long term biodiversity of Malawi's protected areas secured under a vision to help transform impoverished communities on degraded lands around their borders to prosperous communities on healthy lands							
Indicator 1: Number of people with increased economic benefits derived from sustainable natural resource management and conservation as a result of USG assistance	Definition: Increased economic benefits include: increased household income, average increase in income per household, number of new enterprises developed (including but not limited to fisheries, sustainable tourism, forestry/agro forestry, sustainable agriculture, microenterprise, etc.), economic benefits from ecosystem services, etc. Economic benefits may be based on actual cash transactions or other economic value of natural resources.

Unit: # | TLC & partner's databases | Sample survey of beneficiary households | Once every year | TLC M&E Officer | Excel/SPSS | USAID, MoA& FS; Dept of Parks & Wildlife; Dept of Forestry; Ministry of Cooperation and Economic Dev. |

Intermediate Result # 1: Improved governance of protected areas							
Indicator 1.1: Number of hectares in areas of biological significance showing improved biophysical conditions as a result of USG assistance	Definition: "Improved biophysical conditions" refer to stability, improvement, or slowing the rate of decline in one or more selected biodiversity parameters over time such as wildlife populations. Areas identified as biologically significant in this context are national parks and forest reserves Unit: ha	TLC own database / Govt archives; end of project evaluation	Sample survey of protected and border zone areas	Once every year	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; Dept of Forestry
Indicator 1.2: Number of hectares in areas of biological significance under improved management as a result of USG assistance	Definition: "Improved Management" includes activities that promote enhanced management of natural resources for the objective of conserving biodiversity in areas that are identified as biologically significant Unit : ha	TLC own database / Govt archives; end of project evaluation	Sample survey of protected and border zone areas	Semi-annually	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; Dept of Forestry
Indicator 1.3: Number of hectares of natural resources showing improved biophysical conditions as a result of USG assistance	Definition: "Improved biophysical conditions" of NR include increased reforestation, decrease in poaching rates, etc Unit: ha	TLC own database / Govt archives; end of project evaluation	Sample survey of protected and border zone areas	Once every year	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; Dept of Forestry
Intermediate Result # 1: Improved governance of protected areas							
Indicator 1.4: Number of hectares under	Definition: "Improved NRM" includes	TLC own databa	Sample survey of border zone	Semi-annually	TLC M&E Officer	Excel & SPSS	USAID; Dept

improved natural resource management as a result of USG assistance	activities that promote enhanced management of natural resources for one or more objectives, e.g. woodland management, mitigating climate change, and/or promoting sustainable agriculture, etc. Unit: ha	se / Govt archives; end of project evaluation	areas				of Parks & Wildlife; Dept of Forestry; MoA&FS
Indicator 1.5: Number of people receiving USG supported training in natural resources management and/or biodiversity conservation	Definition: The number of individuals participating in learning activities intended for teaching or imparting knowledge and information on natural resources management and biodiversity conservation. Training is done through several methodologies which include practical demonstrations, lecturrete, open days, study tours, etc Unit : ha	Training records / semi-annual reports	Listing of participants to training courses	Quarterly	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; Dept of Forestry
Intermediate Result # 1: Improved governance of protected areas							
Indicator 1.6: Co-management agreements signed between Govt Depts and PAs	Definition: A legally binding agreement between Govt and a legally constituted community grouping allowing mutual benefits	Signed agreement between PA Association and relevan	Participatory formulation of constitution/articles of association	Semi-annually starting in Year 2	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; Dept of Forestry

	from the protection of natural resources in PAs Unit: #	t Govt Depts					
Indicator 1.7: Number of policies, laws, agreements or regulations promoting sustainable natural resource management and conservation that are implemented as a result of USG assistance	Definition: Policies, laws, agreements and regulations include those formed and formally endorsed by government, non-government, civil society, and/or private sector stakeholders with the intent to strengthen sustainable natural resource management. Implementation is demonstrated by adequate institutional structure, capacity, and investment necessary to carry out changes Unit: #	TLC's / Partner's database	Reports	Semi-annually starting in Year 3	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; Dept of Forestry
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices							
Indicator 2.1: Number of households acquired new knowledge/skills in improved livelihoods & NRM practices	Definition: # of beneficiary individuals/households attending training courses in various interventions to improve livelihoods such crop diversification, conservation agriculture, irrigation, tree planting, livestock, etc Unit: #	Training records / reports	Listing of participants to training courses	Quarterly	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry
Indicator 2.2: Number of	Definition: # of beneficiary	Survey data /	Sample survey of	Quarterly	TLC M&E	Excel &	USAID; Dept of

farmers, processors & others who have adopted new technologies or management practices as a result of USG assistance	farmers/processors adopting one or more of the technologies being promoted under the project Unit: #	reports	households / producer groups		Officer	SPSS	Parks & Wildlife; MoA&FS; Dept of Forestry
Indicator 2.3: Number of MSMEs acquired new knowledge/skills in business administration & value-added processing	Definition: # of beneficiary MSMEs attending training courses in business management & value-added processing Unit: #	Training records / reports	Listing of participants to training courses	Quarterly	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices							
Indicator 2.4: Number of hectares under sustainable agriculture practices	Definition: Sustainable agriculture refers to farming methods that allows the production of crops or livestock without damage to the farm as an ecosystem, including effects on soil, water resources, biodiversity and prevention of runoff. These measures under Kulera are: crop diversification, conservation agriculture, soil conservation, soil fertility improvement	Survey data / reports	Direct field measurement and interview of sampled households/fields using a structured questionnaire	Quarterly	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry

	Unit: ha						
Indicator 2.5: Number of hectares under reforestation	Definition: Area under reforestation includes area that is planted to a variety of tree species (indigenous & exotics) as well as areas where natural tree regeneration is allowed with good management practices Unit: ha	Survey data / reports	Direct field measurement and interview of sampled households/fields using a structured questionnaire	Semi-annually	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS ; Dept of Forestry
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices							
Indicator 2.6: Number of households with access to small livestock for nutrition and income	Definition: Number of households that follow improved livestock practices which include selection of improved breed, integrated pest/disease management, improved feeding and housing. The livestock types to be promoted are poultry/guinea fowl, pigs & goats Unit: #	Survey data / reports	Direct field measurement and interview of sampled households/fields using a structured questionnaire	Semi-annually	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS ; Dept of Forestry
Indicator 2.7: Area under irrigation	Definition: Total area under small scale irrigation that involves use of a MoneyMaker treadle pump & low cost	Survey data / reports	Direct field measurement and interview of sampled households/fields using a structured questionnaire	Quarterly	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS ; Dept of Forestry

	gravity-fed systems of river diversion Unit: ha						
Indicator 2.8: New technologies made available for transfer	Definition: New technologies refer to those that have been tested and proven successful but not yet promoted in the target areas. These are conservation agriculture with *Faidherbia albida*, types of solar systems, livestock/crop integration Unit: #	TLC's / Partner's database	Reports	Quarterly	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices							
Indicator 2.9: Number of households/schools/individuals accessing alternative energy sources/fuel efficient systems	Definition: Also referred to as renewable energy which is derived from natural processes which under Kulera includes solar energy, biofuel, mini hydos & fuel efficient stoves Unit: #	Survey data / reports	Direct field measurement and interview of sampled households/fields using a structured questionnaire	Quarterly	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry
Indicator 2.10: Number of communities/ groups engaged in village savings and loan	Definition: A system of village banking which is an informal self help grouping of 20-30 members in a village, predominantly poor households. System relies	VSL groups' records	Listing of groups/membership and interview of sampled groups	Quarterly	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry

	on cross-guarantees & social pressure Unit: #						
Indicator 2.11: Number of carbon projects developed	Definition: Project activities dealing with Agric, Forestry and Other Land Use (AFOLU) will be assessed for their potential to generate emission reductions. These activities may be eligible for registration and implementation under a recognized carbon market standard Unit: #	Feasibility studies, 3rd party verification	Reports	Semi-annually	TLC M&E Officer	GIS; ACCESS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry; Dept of Environmental Affairs
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices							
Indicator 2.12: Quantity of greenhouse gas emissions (GHG), measured in metric tons of CO_2 equivalent, reduced or sequestered as a result of USG assistance	Definition: The amount of emissions, in metric tons of carbon dioxide equivalent (CO_2e), which is reduced or sequestered as a result of USG programs in natural resource management, agriculture, biodiversity, energy, industry,	Feasibility studies	Remote sensing, feasibility studies, 3rd party verification, annual biomass carbon stock estimation, etc	Once annually	Terra Global	GIS; ACCESS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry; Dept of Environmental Affairs

	urban and transport sectors. Relevant greenhouse gases are: CO_2, methane, perfluorocarbons, hydrofluorocarbons, sulphur hexafluoride, and nitrous oxide. Unit: Metric tons CO_2 equivalent (annual)						
Intermediate Result # 3: Increased Rural Incomes from Enterprise Initiatives							
Indicator 3.1: Number of producer groups and MSMEs trained in production, processing, business and marketing skills	Definition: # of beneficiary groups & MSMEs receiving training in production, processing, business and marketing. Training will formal and informal Unit: #	Training records / semi-annual reports	Listing of groups & MSMEs that receive training	Quarterly	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; Dept of Forestry
Indicator 3.2: Number of MSMEs accessing loans from commercial banks / lending institutions / DCA facility	Definition: MSMEs will be supported to access loans for their business ventures that will be promoted under the project Unit: #	Loan agreements; Partner's database	Direct interview of MSMEs and lending institutions	Semi-annually	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry; Ministry of Trade & Industry; MIPA

Indicator 3.2: Volume of NRM and agro-based products produced and sold	Definition: Quantity of raw or value-added products which is well graded, well packaged & labeled. A variety of products both NRM and agro-based will be produced & sold with project support. Under Kulera, the products are honey, fish, mushroom, edible oil, rice, common, beans, other legumes, coffee, seed of Jatropha, spices & dry fruit Unit: tons	Survey data / annual reports / buyers' database; producer's records	Sample survey of produce presented on the market by individual producers or producer groups	Semi-annually	TLC M&E Officer	Excel & SPSS	USAID; Dept of Parks & Wildlife; MoA&FS; Dept of Forestry; Ministry of Trade & Industry; MIPA
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices							
Indicator 3.4: Percentage increase in revenue from eco-tourism	Definition: Increase in revenue to communities & tour guides involved in eco-tourism with links to tour operators. Eco-tourism refers to environmentally responsible travel to natural	TLC's and community/ Tour Operator's / Tour Guides Database	Registry of tourists	Semi-annually in Years 1 & 2	TLC M&E Officer	Excel	USAID; Dept of Parks & Wildlife; Dept of Forestry

	areas, cultural heritage sites, community-based activities in order to enjoy and appreciate nature (and accompanying cultural features, both past and present) that promote conservation, have a low visitor impact and provide for beneficially active socio-economic involvement of local peoples. Unit: %						