

Proposal to the African Elephant Fund

1.1 **Country:** KENYA

1.2 **Project Title:** Building capacity and developing tools for elephant censusing and elephant mortality monitoring in tropical montane and forest habitats in Kenya

1.3 **Project Location:** KENYA

1.4 **Overall Project Cost:**

AMOUNT Requested from African Elephant Fund: 60,000 USD

1.5 **Project Duration:** 2 YEARS

1.6 **Project Proponent:** KIAMBI Sospeter, OTIENDE Moses, and CHIYO Patrick

1.7 **Name of Project Supervisor:** KARIUKI Linus

1.8 **Address of Project Supervisor:** Kenya Wildlife Service Headquarters

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1.11 **Fax:**

1.12 **Date proposal submitted:** 21 August 2015

2.0 **Project Summary:** (not more than 250 words)

The proposed project aims to 1) establish the status of the lesser known populations of elephants residing in forest landscapes in Kenya using dung counts, 2) develop tools for elephant population estimation in montane forest dwelling elephant using dung counts, by establishing dung decay rates and dung defecation rates for these populations and habitats, 3) validate elephant estimates derived from dung counts using capture recapture of unique elephant genotypes because this technique is known to be accurate and more precise for estimating elephant density, but routine use is expensive. Lastly, we proposed to build capacity of the Kenya Wildlife Service staff through training on dung censusing techniques and monitoring of illegal killing of elephants. The output from the proposed project will be useful in establishing the performance and conservation status of the lesser known elephant population in Kenya. The information derived will be used in the management of elephant population through timely security deployment in areas and times of need. Information on population sizes will be used to update the status elephant status database as part of the Kenya Wildlife Service mandate and elephant management strategy.

3.0 **Which Priority Objectives and Activities (there may be more than one) in the African Elephant Action Plan does this project fall under?** (For ease of reference, Priority Objectives are attached under Appendix 1)

Our proposal covers priority objective 5 of the African Elephant Action Plan and the overlap between specific activities under this objective with the objectives of this proposal are stipulated below.

PRIORITY OBJECTIVE 5: STRENGTHEN RANGE STATES KNOWLEDGE ON AFRICAN ELEPHANT MANAGEMENT

Activity 5.1.1. Conduct population surveys in prioritized areas as identified by the regions. (Objective 1)

Activity 5.1.2. Conduct inventories for unknown/less known populations to ascertain their biological status and their habitats. (Objective 1)

Activity 5.1.4. Investigate new and economically viable methods for the study of elephants on the continent. (Objective 3)

Activity 5.1.5. Continue participating in the MIKE and ETIS programmes (Objective 4).

Activity 5.2.1. Maintain and update databases on elephant populations for management purposes. (Objective 1)

Activity 5.2.2. Coordinate research efforts, compile and disseminate research findings.

Objectives and activities specific to our project area include the following:

Objective 1. Determine the status of forest elephant populations in Kenya using dung counts

Objective 2. To validate the accuracy of population estimation from dung counts using non-invasive molecular genetic procedures

Objective .3. To develop tools for censusing elephants in tropical montane and coastal forests using dung counts, particularly habitat or population specific defecation and dung decay rates

Objective .4. To develop capacity of KWS field staff f on protocols for censusing forest elephants and carcass detection and monitoring in montane and coastal habitats

4.0 Project Rationale – why is this project necessary and urgent? What threats face this elephant population (give, for example, what information you have regarding population details, trends in population (downward or upward), ivory seizure information, details about levels of poaching, human/elephant conflict, etc.).

Population estimates and statuses in montane and coastal forests are poorly known because of visibility which hinders aerial based counts which are a popular method for elephant population estimation in the Savannah habitats dominant in Kenya. In Kenya, forest habitats harbor more than 10% of the national elephant population. These habitats include Mt. Kenya, Mt. Elgon, and Mau forest, Shimba Hills, Arabuko Sokoke and Mau Forest. Some of these populations are risk of decline for illegal killing for ivory. An analysis of PIKE (Proportion of Illegally Killed Elephants) in Kenya, PIKE has been oscillating around the acceptable 0.5 mark, except for Mt. Elgon, where PIKE has been consistently higher. The coastal areas including Shimba Hills and Arabuko Sokoke, Lamu and Boni Dadori elephant populations and central rift conservation areas; including Mt. Kenya and Mau Forest have seen a gradual increase in PIKE levels during 2001 to 2014 periods. Monitoring illegal killing of

elephants currently uses aerial population and carcass counting and validation through foot patrols are ineffective in forest and woodland areas in the region.

Censusing techniques using dung counts is a well-established technique for censusing elephants in forested or heavily wooded habitat where limited visibility prohibits the use of aerial counts. However, accurate and precise population estimates are dependent on good estimates of the dung defaecation rates and dung decay rates. Most estimates of dung decay and defecation rates have been estimates for lowland tropical rainforest and there is a dearth of information for elephant defecation rates in tropical montane forests or coastal forests where most elephants in Kenya reside (Walsh et al., 2001, Hedges et al., 2013). Recent studies show that DNA based capture recapture methods produce elephant population estimates that are more precise and reliable (Hedges et al., 2013). In Kenya, for example, the Mt Elgon National Park is one of the sites designated for the monitoring of illegal killing of elephants, but there are no recent population estimates for this elephant population. This creates an urgent need to develop routine tools for monitoring population trends.

5.0 Detailed Proposal – including activities to be carried out, milestones (at least quarterly milestones), timelines, equipment to be purchased, reporting procedures, etc. (not more than 1000 words). It will be helpful in evaluating this Project Proposal if you to divide it into phases such as Planning; Procurement; Implementation; Evaluation and Reporting

Should include anticipated benefits (including benefits to the conservation and management of elephant populations and communities) and outputs from the project, and how the project will be monitored and evaluated.

Objective 1. Determine the status of forest elephant populations in Kenya using line transect to estimate elephant dung counts.

Status updates for all elephant populations in Kenya are required every 2-4 years as part of the National elephant management strategy. Such updates will help Kenya Wildlife service to identify areas of populations under threat and will enable the deployment of scarce security resources for the protection and conservation of the African elephant in Kenya.

Activity 1.1. Conduct dung surveys for estimating elephant populations in Mt. Elgon, Mt. Kenya, Mau forest, Shimba hills, Arabuko Sokoke, and Aberdares elephant populations using line transects. 10-20 straight-line-one kilometer transects will be established in each protected area and stratified according to altitude and elephant density.

Activity 1.2. Measure dung bolus diameter and footprints dimensions for age structure estimation. For each dung sample encountered, the stage of decomposition will be noted and if fresh, bolus diameter will be measured. Approximate age of the elephant voiding dung can be estimated using equations developed for known age elephants.

Activity 1.3. Monitor the illegal killing of elephants through opportunistic collection sighting of carcasses and elephant death reports.

Objective 2. To validate the accuracy of population estimation from dung counts using non-invasive molecular genetic procedures

Accurate baseline population estimates are required for elephant conservation. However, reliable elephant estimates based on dung counts or aerial counts are very unreliable in forest habitats. Accurate population estimates are required for trend detection in forest elephant populations in order to identify populations that are either at risk from poaching or loss of habitat.

Activity 2.1. Collect fresh dung samples for fecal DNA capture-recapture methodologies as appropriate methods for survey of forested habitat with high such as Mt. Kenya National Park, Shimba Hills National Reserve or low elephant densities such as Mt. Elgon National Park, Mau National forest and Arabuko Sokoke National forest. Fresh dung samples collected in the field will be preserved in 95% ethanol and transported to Nairobi for genetic analysis. The target is to collect 150-300 dung samples from each protected area in order to maximize the number of samples with positive DNA extraction and PCR amplification.

Activity 2.2. Conduct DNA extraction from feces, and conduct PCR using elephant specific primers that have been used and validated by previous studies. We will target 5-6 polymorphic microsatellite loci for individual recognition and sex specific locus for sex identification. For all dung samples collected for genetic analysis, bolus diameter will also be measured to help in age determination. DNA extraction and PCR will be conducted at the Forensic and molecular genetic facility at the Kenya Wildlife Service.

Activity 2.3. Conduct molecular genotyping and genetic profiling of individual elephants from all populations. Genotyping will be conducted at the ILRI genotyping and sequencing facility in Nairobi.

Objective .3. To develop tools for censusing elephants in tropical montane and coastal forests using dung counts.

To convert dung counts to elephant population estimates, information on elephant defecation rates and dung decay rates need to be estimated. Unfortunately, estimates of dung decay rates and elephant defecation rates may depend on habitat and season. This creates urgent need to develop and establish population and habitat specific defecation and dung decay parameters for elephants.

Activity 3.1. Monitoring dung decay rates in Shimba hills, Mau forest and Mt Elgon forest and Mt. Kenya forests. In each of these protected areas, 30-40 fresh dung piles (preferably 1-2 days old) will be marked and monitored once a week for decay and visibility. The purpose is to estimates dung disappearance rate.

Activity 3.2. Monitoring elephant defecation rates in Shimba Hills and Mt. Elgon. Two to five elephant groups with a known number of individuals will be located and tracked for all defecations will be recorded to obtain estimates of defecation rates and hence dung deposition rates.

Objective .4. To develop capacity of KWS field staff f on protocols for censusing forest elephants and monitoring of illegal killing of elephants in montane and coastal forests.

The capacity for Kenya wildlife staff in monitoring forest elephant population can be developed through training and through provision of appropriate gear and equipment.

Activity 4.1. Recruit, train and equip five (5) MIKE site officers for Tsavo, Mt. Elgon, Meru National Park and Samburu-Laikipia MIKE sites, and Masai Mara from existing field staff of the Kenya Wildlife Service.
Activity 4.2. Train 5 field staff in each protected area on the design of line transects sampling regimes, use of campuses, range finders and GPS units. The training will also involve navigation skills and safety and survival skills in forested habitats.
Activity 4.3. Procure field equipment and gear essential for elephant censusing including campuses pedometers, range finders, tape measures and binoculars. Using finances from the proposed project, 5 pedometers, 5 rangefinders, 5 50-meter tape measures and 5 binoculars will be procured and used for routine elephant monitoring and dung censusing in forest landscapes in Kenya.

This project is planned to be implemented within 2 years. For monitoring and evaluation, we have divided the two year period into 4 quarters each quarter being approximately 6 months. Below is an outline of quarterly project outputs and indicators.

Objective activity	Output	Phase 1	Phase 2	Phase 3	Phase 4
1.1	Reports on elephant dung estimates	dung census in 1 population completed	dung census in 3 populations completed	dung census in 2 population completed	Final report
1.2	Report on age structures from dung measurements and counts	age structure of 1 population completed	age structure of 3 population completed	age structure of 2 population completed	Final report
1.3	Reports on elephant mortality and causes		Reports on elephant mortality and causes from Mt. Elgon and Tsavo National Park	Reports on elephant mortality and causes from Mt. Elgon and Tsavo National Park	Final report
2.1	Dung samples collected and properly preserved in ethanol	At least 100 dung samples collected	At least 300 dung samples collected	200 dung samples collected	
2.2 & 2.3	Genotyping, and elephant genotype profiles generated	Laboratory materials procured	DNA extraction, PCR and genotyping of at least 100 samples	DNA extraction, PCR and genotyping of at least 300 samples	DNA extraction, PCR and genotyping of at least 200 samples, Genetic

					profiling and population modelling
3.1	Dung samples are tagged and monitored, dung decay rates established	at least 30 dung samples marked and monitored	another 30 dung samples marked and monitored	dung decay monitoring continues	Dung decay analyses conducted and report on dung decay rates
3.2	Elephant defecation studies conducted, and elephant defecation rates estimated	Elephant defecation studies conducted in a coastal forest		Elephant defecation studies conducted in a montane habitat	
4.1	Field staff trainees and MIKE officers identified	Field staff trainees and MIKE officers identified			
4.2	Staff are trained on elephant dung census procedures and MIKE protocols, training manuals produced	Field staff and MIKE officers trained			
4.3	Materials (GPS units, range finders and Campuses and tape measures) procured	All materials need are procured			

6.0 Project Timeline – outline the timeline for proposed activities within this project. You may find it helpful to relate the timeline to the Phases identified in Section 5.0 above.

Activity (see proposal above)	Phase 1	Phase 2	Phase 3	Phase 4
1.1				
1.2				
1.3				
2.1				
2.2 & 2.3				
3.1				

3.2				
4.1				
4.2				
4.3				

BUDGET

7.0 Has this project received or been pledged any other sources of funding (external)? Give all relevant details (for example, amount, source of funds, timetable, any restrictions):

7.1 Please provide a detailed proposed budget for this project (in US\$). You may find it helpful to relate expenditure to the Phases you have set out in Section 5.0

Details included in Table annexed to the document:

Full Proposal Budget				
Budget line		Expected source of funds and amounts		
		Proponent(GOVT.)	AEF	Other
1.	Field Equipment (please list the equipment) (USD)	2,500	2,500	
2.	Capacity building (Training), (USD)	2,500	2,500	
3.	Dung censusing costs (USD)	5,000	15,000	
4.	Dung Sampling costs (USD)	5,000	5,000	
5.	Laboratory supplies and genotyping costs (USD)		35,000	
.	Grand Total (USD)	15,000	60,000	

Note: AEF funding does not support purchase of firearms.

Any other budget lines:

7.2 Please specify the proponents contribution towards the project

Kenya Wildlife Service will contribute USD 15,000 towards the project as matching funds to support various activities as stipulated.

Please submit the completed proposal, either by:

Email:

Fax:

You should receive acknowledgement of receipt of your proposal within 14 days.
If you do not receive such an acknowledgement, please telephone:

Further details on any of the above details may be requested by the Steering
Committee of the African Elephant Fund.