A Review of the Population Status of Forest Elephants in Mau Forest, Kenya

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Summary

The Mau Forest Complex in Kenya's highlands is regarded as the most important stronghold for the Forest elephant *Loxodanta africana*. Despite this, little attention is given to this population, with much focus going to savanna elephants in National parks and other protected areas. Between 2013 and 2014, over 300 elephants were killed for their tusks in Kenya alone. A recent survey in Mau Forest Complex indicates that ivory poaching in Mau Complex is common but largely unreported. The lack of baseline data on the importance of the Mau complex as a stronghold for elephants often makes it difficult to monitor their population and inform management decisions on their conservation. In this project, we profiled the status of elephant conservation in Mau Forest as a first step in establishing the population status of forest elephants in Mau Forest. Using available literature, sightings and reports, we collated and mapped forest sightings and threats in Mau Forest, Kenya. The study provides an important starting point for mapping the preferred microhabitats for forest elephants and seasonal migratory routes, and profiling of the poaching hotspots for forest elephants in the near future. Results of this project will directly be used for management of Kenya's forest elephant population, including providing baseline information for their management and curbing of poaching incidences.

Introduction

The African elephant, *Loxodonta Africana*, is the largest terrestrial animal in Kenya. They occur in the savannah and forest ecosystems. The savannah elephants are larger than the forest ones in both body size and range areas. The largest range areas are the Tsavo ecosystem and its environs for the savannah elephants. Forest dwelling populations are mainly located in Mt. Kenya, Aberdares, Mau forest and other isolated populations in coastal forests among other areas.

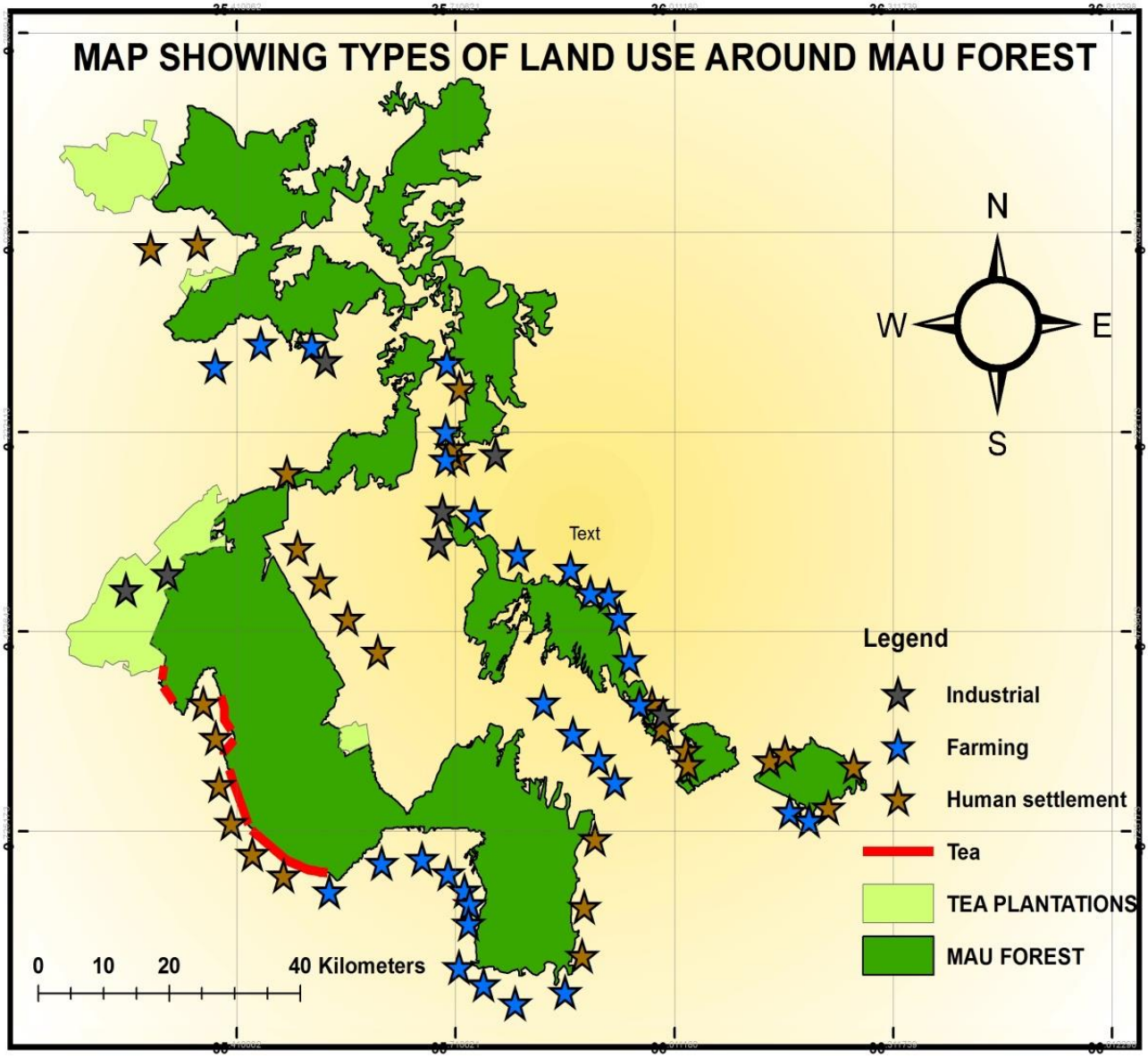
Elephants are important to the people and government of Kenya and the international community. Their existence is beneficial to the people and ecosystems, just as it is of concern. Their population reduced from an estimated 167000 in 1973 to about 20000 in 1990 due to poaching. A conservation and management strategy for the elephant in Kenya identified key reasons for elephant protection in Kenya. Poaching was regarded as the most important reason due to elephant population declines. Secondly, elephants were identified as flagship species.

Thirdly, conservation of elephants depends on conservation of the ecosystems that they thrive and thus a larger conservation goal. Fourthly, human conflict in areas near protected areas was intense and had negative public support for their conservation. Fifthly, elephants are keystone species in an ecosystem dynamics.

Effective conservation of elephants is a relatively hard task. The challenges can be unique to elephants or in other wild animals. Elephants depend on the ecosystem for their survival. Conservation goals should therefore be broad to focus on the larger biodiversity goals. The inherent biology of elephants also presents a challenge on its own. Some of the aspects to consider in their biology include:

- Elephants are very social animals and they form family groups.
- High levels of intelligence. They have an exceptional memory and communication ability. This may affect how they respond to disturbances, relocation and human conflicts.
- They travel vast areas in search of food and water. Males also travel to find mates.
- Generalist feeding behavior accompanied by feeding of large quantities of vegetation.
- They are large in size and have a long gestation period. This may lead to a slow growth in their population.

In the year 1989, the Kenya wildlife service (KWS) was created. It was established as a state organ to combat wildlife challenges, especially poaching, at the time. KWS replaced it predecessor, Wildlife Conservation and Management Department, which had not been able to halt elephant poaching. This was a clear step that the government was not going to tolerate poaching of wild animals for their trophies. Hunting of elephant declines with some areas such as Mau forest reporting only two cases of poaching in the time. Kenya has ratified to some international treaties such as CITES and CMS. Elephants were listed in Appendix 1 of CITES in 1989. This enabled the international community to avail resources in KWS which made it achieve much success. The recent increase in human population has brought new challenges to the management of elephants in Kenya. Human animal conflicts have been on the rise and especially near or on the borders of protected areas. Huge losses are incurred by farmers who demand compensation from KWS. Laikipia has the highest record for compensation claims in Kenya and Narok areas in Mau forest (African elephant status report, 2002). In the future, effective conservation will require both the government and private landholders to work together with a common goal.



Status of Elephant Conservation in Kenya

Conservation of elephants has changed over time as new challenges emerge. The traditional main threat to elephants was poaching for trophies and hunting for sport or meat. There was a debate centered on local overpopulation of elephants in national parks, that was in the 1960s (Buechner & Dawkins, 1961). The following two decades saw elephant population decline to near extinction levels. Poaching for ivory was the main cause of the decline (Parker & Graham, 1965). The listing of elephants on CITES Annex 1 saw the price of ivory drop and poaching

declined. The current major threat to elephant population is conflict with humans. Conflict arises as a result of destruction of crops, damage to property and killing of humans by elephants (Sukumar, 1989). The human population has grown over the years

The recent developments in technology has allowed for large-scale destruction of indigenous forest. This encroachment for settlements and agriculture has caused loss of habitat and cutting off historical elephants corridors. Elephant populations are therefore compressed into small island habitats. Isolated pockets have increased human-elephants conflict. Forest ecosystems have more human-animal conflict as reported by KWS in Mt Kenya, the Aberdares, Shimba hills and Mau forests. To address human-elephant conflict, KWS may shoot a number of problem animals known as PAC (problem animal control). Traditional methods of preventing elephants from raiding crops, such as use of fires and loud noises have not been effective, especially where farms are far apart(Bell & McShane Caluzi,1984).

The compression of elephants may also be solved by translocation of elephants to reduce pressure on the ecosystem and possibly reduce problem animals. Electrified fences, designed to stop elephants have been considered as an alternative solution for problem animals (Woodley & Snyder, 1978). Kenya wild life service (KWS) had plans to undertake large-scale fencing projects, majority of which will be designed to stop elephants (Kenya Wildlife Service, 1990). Not all elephant fences have worked. There are some that have failed and have been abandoned. Others have managed to reduce but failed to finish crop raiding by elephants (Mkanda, 1992).

Estimating the range of elephant population is central to their conservation efforts. Evaluating the range of elephants has been faced with difficulties.in cases where elephant range areas are based on natural landmarks such as rivers or administrative boundaries; this may not reflect the actual area used by elephant population. Defining range is also problematic in low-density populations, where elephants cross international borders and areas with few observers. The area and composition of ecosystems used by African elephants is affected by their search for resources. Elephant range areas may be defined by hard edges such as fences or habitat change e.g. from forest to savannah. The range map for elephants for Kenya was revised and there was no considerable change in rangeland. A report by African elephant status report in 2002 reported sighting of elephants in areas not known to have them. The areas include L. Baringo, Bogoria and the outskirts on Nairobi.

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Category	Description
Known range	Areas of suitable habitat which, if searched with reasonable intensity, are likely to yield signs of elephant presence. If such presence is absent for a 10-year period, Known range is degraded to Possible range.
Possible range	Areas within historical range and in suitable habitat where there are no negative data to rule out the presence of elephants.
Doubtful range	Areas where there are reasons to believe that elephants are no longer present, but which have not been formally surveyed. If further corroborative evidence is obtained, areas of Doubtful range are re-classified as Non-range.
Non-range	Areas with no elephants, due to habitat conversion or local extinction.
Point records	Sightings or signs of elephants outside of Known range.

Table 2: Elephant Range descriptions as described by AfESG, 2002

There is an estimated area of 90,000-100000 km of known elephant range in Kenya. The other categories, possible range area and not known, cover about 7000-15000 km. Data from the African elephant database show no significant decline in the area of known range in Kenya. There was also report of new sightings in areas not known to have elephants. All the above cases were attributed to improved information and better definition of range area rather than a measurable range contraction.

Elephant range in km2	2002			2006		
	Known	Possible	Total	Known	Possible	Total
Surveyed/ assessed	86,079	Not available	86,079	79,043	8,889	87,932
Un-assessed	15,670	7,318	22,988	12,597	6,584	19,181
Total	101,749	7,318	109,067	91,640	15,473	107,113

Table 3: Elephant range in Kenya

From the above table, the following key points were reported by the conservation and management strategy for the elephants in Kenya:

- The elephant range outside protected areas was significant
- The range of individual populations cross KWS conservation area boundaries, indicating the importance of community participation in conservation
- Some populations cross international boundaries
- The main areas of contiguous elephant range are:
    - i. the northern coast
    - ii. the Tsavo-Chyulu-Amboseli-Kilimanjaro complex
    - iii. the Aberdare-Mt Kenya-Laikipia-Samburu-Northern Area complex
    - iv. the Nguruman-Mara-Serengeti complex
    - v. Nasolot-Romoi-Kerio Valley

Natural resource management, like other resource management, is affected by the policies and legislation within and outside a country. Kenya has been at the forefront to pass laws and policies that have improve elephant management both directly and indirectly. Forest, agriculture, water, tourism and land are among the various sectors that related to elephant management. Coordination among these various sectors is important because single policies on their own cannot be effective without complementing each other.

Environmental policies in Kenya have seen some Acts of parliament passed. The first to be effective was the The Environmental Management and Coordination Act, 1999. The Act provided for the establishment of legal and institutional framework to harmonize environmental management.it also recognized the environment as an integral part in the process of national development. Another policy passed was the Sessional paper No.6 on Environment and Development, 1999. This policy was to integrate environmental protection and development

goals. Environmental sustainability was emphasized in this paper .the government showed commitment in some of these areas:

- allow local communities to benefit from wildlife earnings
- establish zones that allow multiple use management of wildlife
- involve local communities in wildlife conservation management
- integrate various wildlife development and conservation activities in protected and dispersal areas
- prepare management plans for their conservation and management

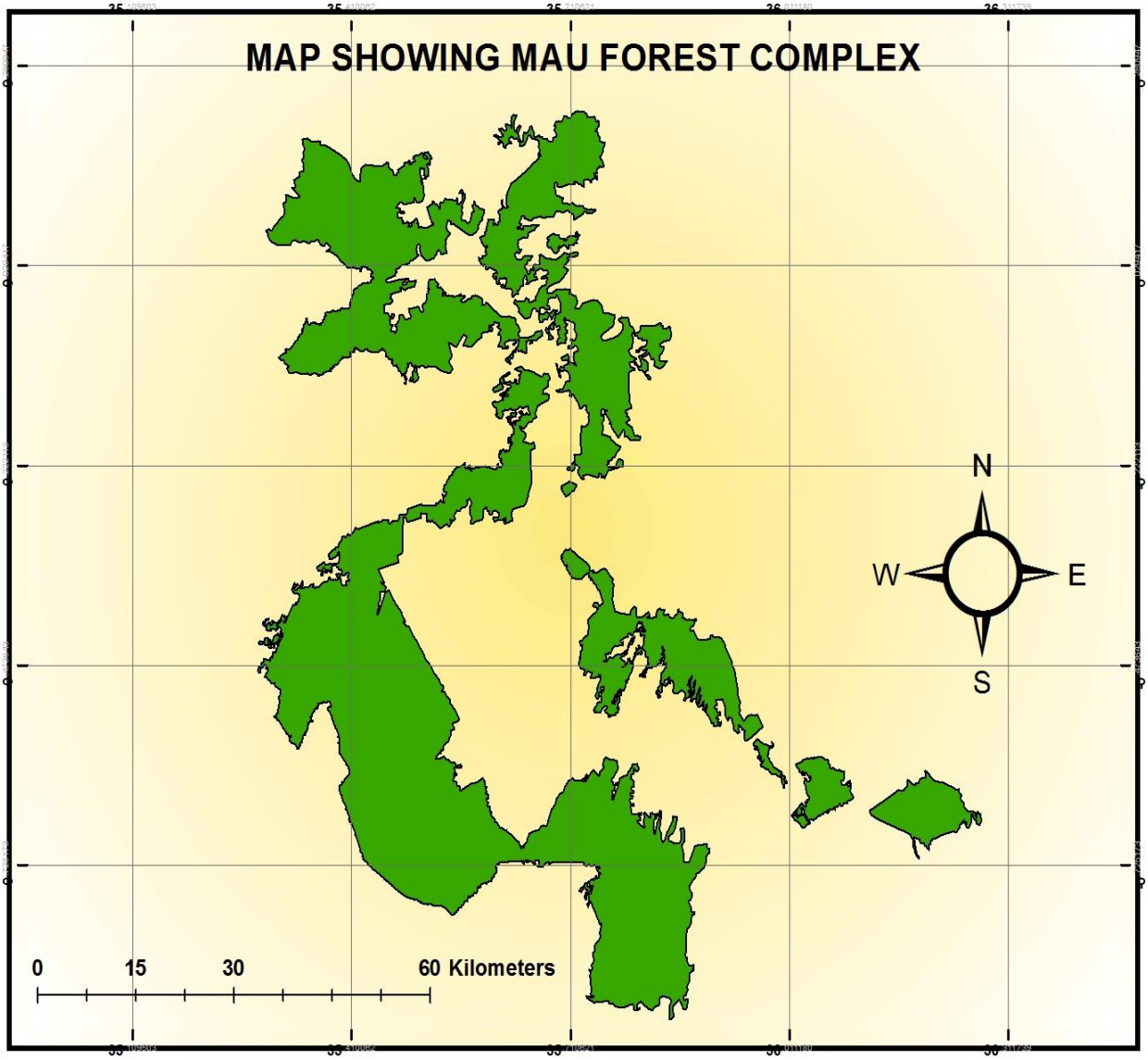
The National Biodiversity Strategy, 2002 is the overall action plan to address the national and international actions relating to the Convection on Biological Diversity(CBD). The convection aimed to ensure that the rate of biological diversity is reversed and current trends are minimized to near natural loss levels. Pillars of the convection are sustainable use, fair and equitable sharing benefits from utilization of biodiversity resources and to enhance technical and scientific cooperation at the national and international level.

The Sessional Paper No.3 of 1975 was a radical move from previous policies relating to wildlife. The previous policies had relatively slow progress with implementation. The paper is the embodiment of the KWS wildlife policy. Key elements in the sessional paper are:

1. The government took over the duty of paying compensation for damages caused by wildlife
2. Compatible land use practices to be adopted and fair distribution of benefits from wildlife including both non-consumptive and consumptive uses of wildlife.
3. It identified the primary goal of wildlife conservation as the optimization of returns from wildlife.
4. It underscored the need for an integrated approach to wildlife conservation and management in order to minimize human-wildlife conflicts.

Population Status of Elephants in Mau Forest

Mau forest is Kenya's largest water tower of the five main towers. The towers store rain water and release it during the dry seasons. This ensures a relatively adequate supply of water. The original forest cover was 400 thousand hectares, but 100 thousands of these have since been exploited. The Mau Forest Task Force identified the period between 1996 and 2005 as the worst decade for the forest cover in the country during this period more than 100,000 hectares - have been cleared for human settlement and agriculture.



The population status of elephants is derived from population estimates. The data can then be used to compare trend in populations within elephant ranges and even across the continent. The estimates help in evaluating population growth or decline. Various methods can be used to obtain population estimates. Aerial total counts, dung counts and informed guesses are among the methods. Estimates obtained using the same method can be considered valid when comparing between sites. However, it should be noted that different methods of calculating estimates produce results of varying degrees of accuracy and precision. Estimating populations of elephants in the savannah is relatively standard. Direct count can be done due to the visibility of the open vegetation. In thick forests, estimates are obtained through indirect methods. The primary method used is the dung count.

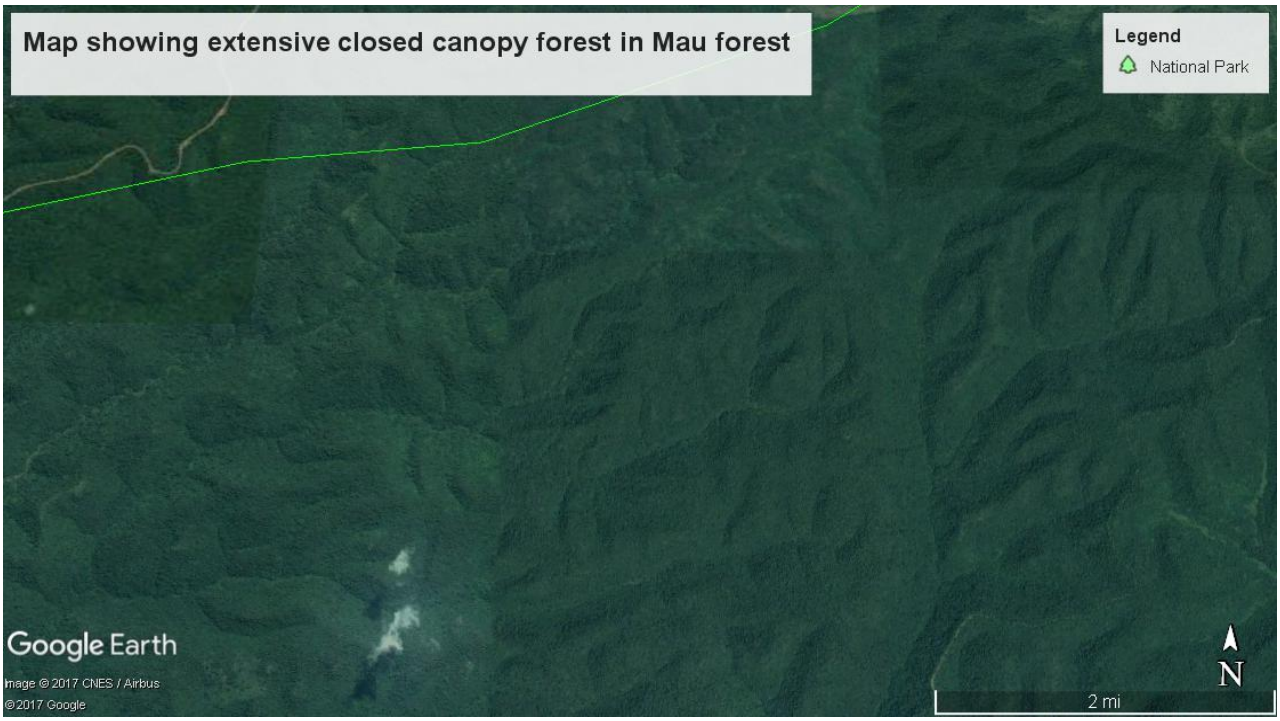


Plate 1: Closed canopy forest, Mau Forest, Kenya

The Mau forest complex is a composition of continuous forest in close proximity. Together, they form the largest indigenous montane forest in Kenya. Habitats found in the forest complex are montane forest, bamboo and scrub grassland. Traditionally, elephants were believed to exist throughout the Mau complex. Surveys carried out in the Mau forest in October 1991 indicated low densities throughout the forest. However, there was a higher dung density in the western Mau forest and within the bamboo region of S.W Mau forest. Another survey carried out in February 1992 sampled the bamboo regions more extensively and more elephant dung was discovered. The later survey estimated elephants at 207+-82 elephants. This was a representation of the 314 square kilometers of bamboo and bamboo-forest (S.W Mau forest and Trans Mara forest). A density of 0.66 elephants per km square was calculated. In 1995, the elephant population was estimated at 1003 animals. Most available data from KWS used dung density method to estimate the elephant population. This estimate was from the forests of the Mau except the Ol Pusimoru forest. The highest dung density was found in the mixed bamboo forest area of Keringeti and the montane areas of Kerisoi-Githuma. Njumbi and others who conducted the survey recorded no elephants, virtually, on the western side of the forest. They further attributed the higher densities found on the other sides of the forest on weather seasons. They suggested that elephants moved to the drier eastern forest during the wet season. The earlier wet season count did not include the eastern part of the forest. The above results show that more detailed surveys should be conducted as the rate of dung decay was not done on site.

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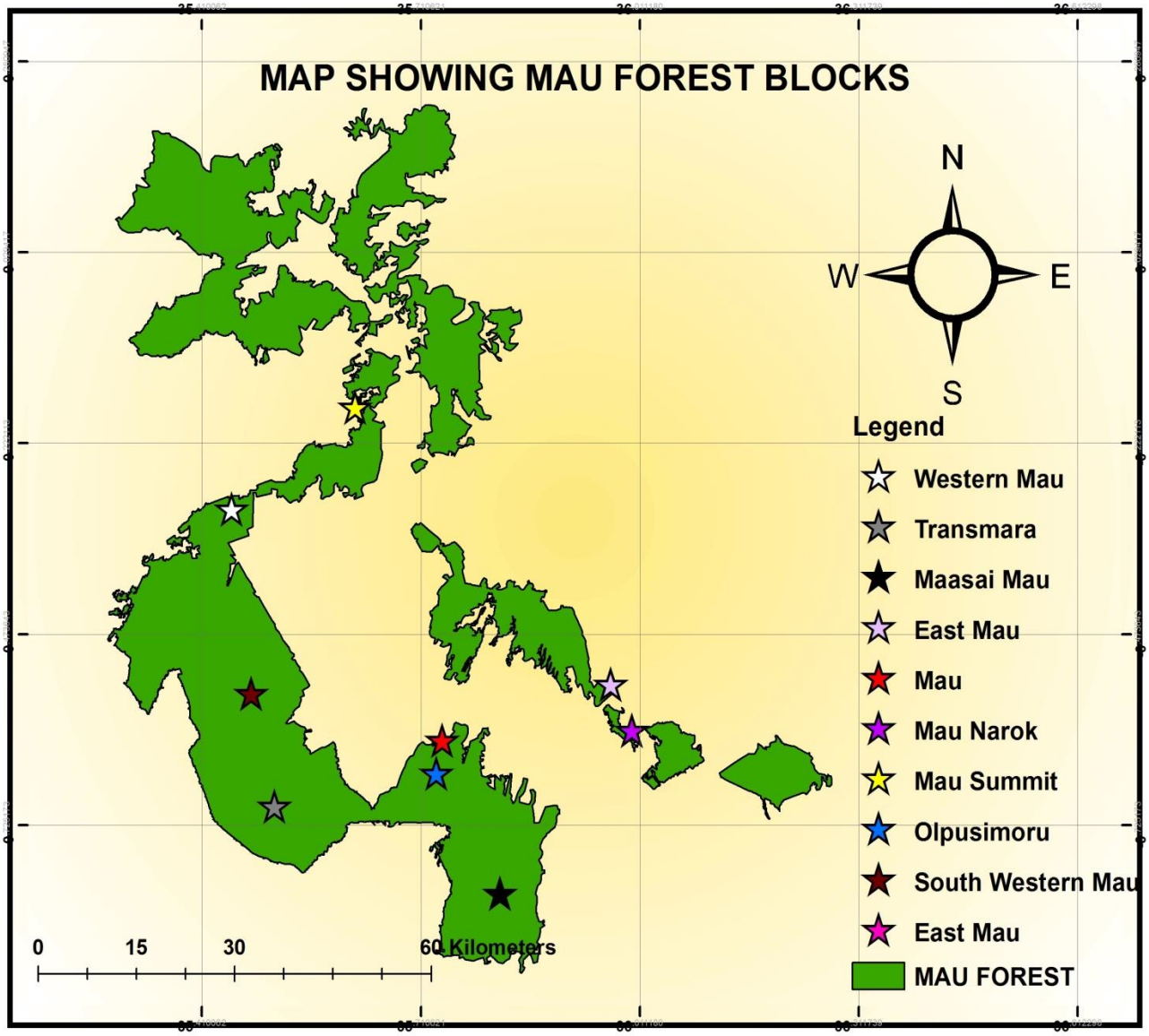
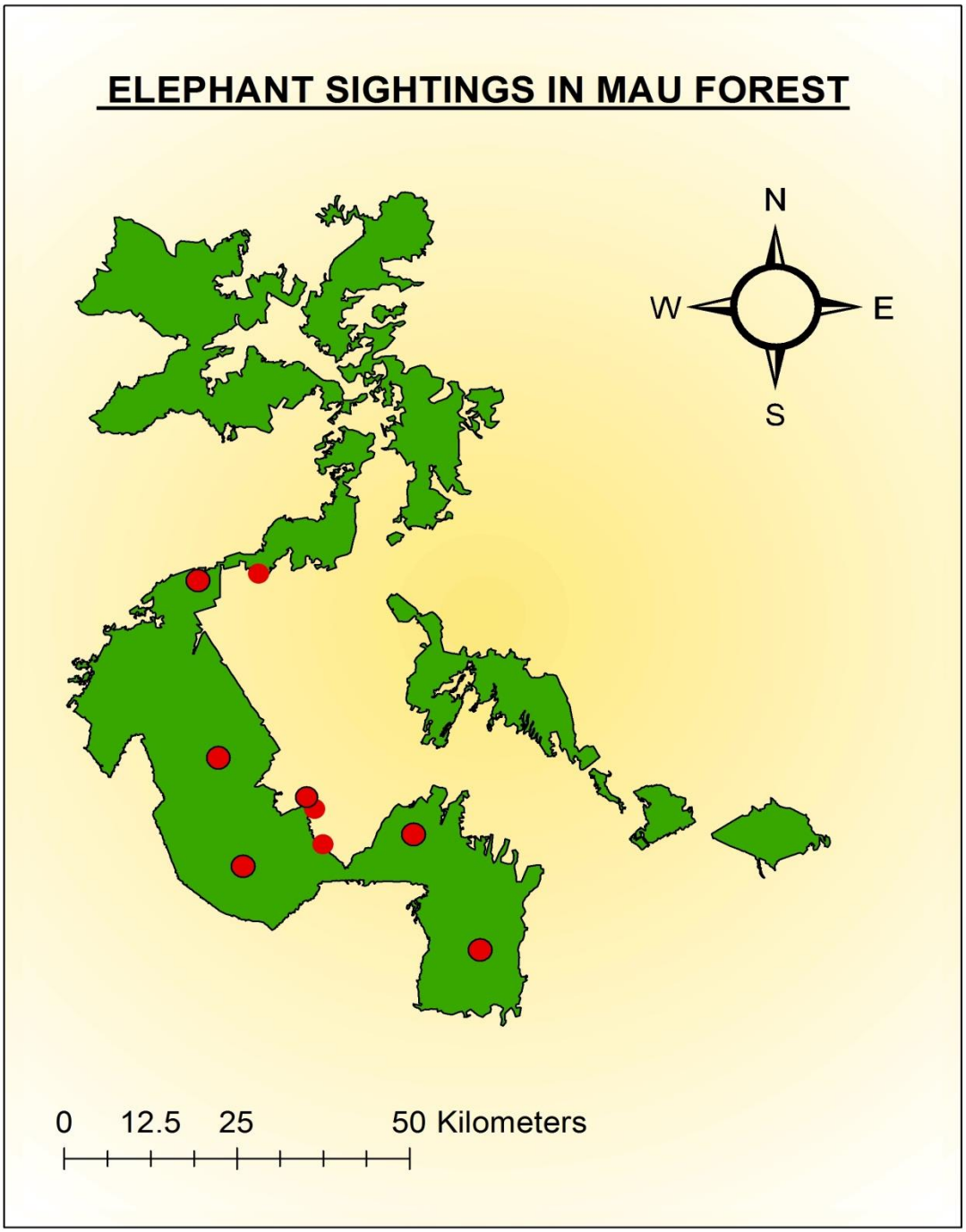


Fig 2: Mau Forest blocks

An elephant survey was carried out by KWS in September 2016. This is line with the requirement for KWS to update its database on elephants. During the survey, they collected data from dung count, carcasses and total counts. Elephants were found to be limited to the five forest blocks namely: Southern tip of western Mau, South Western Mau,Trans Mara, Olpusimiru and the Maasai Mau. The total area covered during the survey was estimated at 1458 Km². the estimated elephant density was 0.45 elephants per Km². the elephant density was lower than the previous survey that was 0.66 elephants per Km². in 1995 the population of elephants was estimated to be 1003 while the survey carried out in September 2016 was 652 elephants. This

was a reduction in population by a shocking 35%.Elephant carcasses were recorded during the survey. They were found in Trans Mara forest block and one of the carcasses was fresh.



The Ogiek people are found throughout the forest complex. Traditionally, they were a hunting and gathering society. Today, almost all of them have embraced animal husbandry and cultivation from their neighboring communities. The Mau forest has a diversity of habitats due to varying ecological zones. Altitude is the primary factor determining the habitat found at a certain point due to rainfall and temperature. The Ogiek distinguished five types of forest in the Mau complex;

1. Soyua: A relatively dry forest dominated by short trees with thick undergrowth.
2. Sasaondet: Taller trees than that of the soyua with less undergrowth.
3. Tirap: Trees are mature and tend to be very large. Undergrowth is generally low
4. Sisiyuet: This is a bamboo-dominated forest. It is thick and accessibility is difficult.
5. Olopirigit or Mau: this forest area is dominated by open glades of moorlands.

Honey was and is still is an important commodity for the Ogiek. It was used as food and a medium of exchange. Honey production depends on the flowering season of plants which depends on rainfall. The Ogiek migrated depending on the where the flowering season was. Due to this occasional movement, they built temporal structures and owed few belongings for ease of movement. Meat was also an important diet for the Ogiek. They practiced hunting throughout the forest. They used a number of techniques to hunt depending on their location and the type of animal e.g. bows, dogs, and traps. Bows were used to hunt relatively large animals; elephants were also hunted using the bow. Poison was normally added at the tip of the arrow to increase chances of a kill. Elephants were mostly hunted using a special wooden shaft enlarged at both ends with a hole to put an arrow-like projection of wood. The fore shaft was covered with poison. Traditional hunting of elephants required each hunter to spear his own elephant even if they were hunting as a group. The meat from a single elephant was enough to feed them for a while. Commercial hunting of elephants was not known to exist. This hunting method was important to maintain a relatively stable number of elephants in the Mau. Their traditional way of living has not had a major impact on the forest.

The recent developments in technology has allowed for large-scale destruction of indigenous forest. This encroachment for settlements and agriculture has caused loss of habitat and cutting off historical elephants corridors.

Conclusion

The elephants in Kenya have benefited from the national and international treaties and agreements in their favor. Their current population is evidence enough that the population trend in currently on an upward path. The government of Kenya has made tremendous efforts to rescue the elephants. The various laws and policies in place are a clear indication of the commitment. Future management of elephants will see a shift in management patterns as threats to elephants are shifting. The traditional major threat was poaching and currently, human-wildlife conflict is the major challenge. More research will be needed in order to cope with the challenges.

Conservation will however require more than emphasis on the elephants alone and will need to take a holistic approach and include the ecosystems in which they stay. Due to the nature of elephant size, feeding habits and movements, it is clear that commitment for their conservation will require more than government efforts. Local residents who live or farm outside protected areas where elephants appear will also have to commit to their conservation. This can be achieved by engaging in land-use practices that can harmonies their interaction. This can reduce compensation claims from farmers and help people improve on their perceptions and attitudes towards elephants. Movement of elephants between ecosystems will also improve. Isolation of populations will not be as rampart and will avoid inbreeding.

Acknowledgements

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