Phase one of Siyapei-Masai Mara elephant translocation

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Abstract

This report outlines the translocation exercise of elephants from Siyapei in Narok North District to Masai Mara National Reserve (MMNR) in Narok South District. The translocation was intended to minimize human-elephant conflict (HEC) in the district. The underlying cause of high HEC was brought about by diminished elephant habitat due to their conversion to farmland and increased human population. The translocation team was divided into three: the search team, the darting team, and recovery ground team. The translocation exercise was planned to take place in 2 phases. This report covers lessons learnt from the first phase that targeted 50 elephants. But a total of 62 elephants were successfully moved to MMNR. The trans-location was preceded by intensive pre-trans-location monitoring and community sensitization. Five of the trans-located elephants were fitted with Satellite collars to assist in post-release monitoring. An intensive post-release monitoring using the collars, aerial survey and ground sightings is ongoing. The second phase of the translocation will depend on results of post translocation monitoring of phase one.

Key words: Narok North, Elephant, Translocation, Maasai Mara

1.0 Introduction

Narok County is endowed with abundant natural resources ranging from wildlife and forests. It is a prime wildlife area where wildlife and people interact outside the protected areas. The elephant population in Narok County has increased steadily over the past years. For example, the population increased from about 1029 animal in 1984 to about 3072 animals in 2007 (KWS report, 2007). The county comprised of three districts namely Narok North, Narok South and Trans-Mara mainly previously inhabited by the Maasai community who practice pastoralism, a land-use system which has been very compatible with wildlife conservation in the area. However, there has been an influx of other communities to the county, comprising mainly of Kikuyu and Kisii communities, who practice crop farming. The Maasai community has also changed their lifestyle from nomadic pastoralism to sedentary crop farming.

Rapid change in lifestyle of local communities from pastoralism to crop farming and land-use practices which are not compatible with wildlife conservation have led to increased HEC in Narok-North district. HEC in many areas is mainly attributed to increased human population and loss of elephant

habitat due to uncontrolled human activities like crop farming, charcoal burning and settlements. Narok-North is currently designated as one of the human-wildlife conflict (HWC) hotspots in the country with elephants identified as the most problematic wildlife species. Long-term monitoring of elephant movements in the affected area through satellite tracking and aerial surveys have established that approximately 200 elephants have been cut off from the greater Mara ecosystem and are currently considered a sub-population of the Mara (Said *et al.*, 1997; Omondi *et al.*, in prep)). HEC in Narok-North district is escalating at an alarming rate. There has been a 14% annual increase in HEC case in Narok north district over the last 7 years (KWS, 2010).

Due to increase in human population, the landscapes in Narok North district has greatly changed over the last 20 years through general environmental degradation characterized by rapid conversion of wildlife rangelands into agriculture. Deforestation, charcoal burning, wood logging and human settlements have exacerbated the loss of wildlife range areas. As a result, there has been an increase in human wildlife interaction and consequently increasing human-wildlife conflict (Sitati *et al*., 2011). Incidences of human-elephant conflicts (HEC) are high in Narok-North district leading to frequent human injuries, deaths and property destruction (Sitati *et al*., 2011). Reports from Narok station indicate that out of the 9,299 HWC cases reported in the last 10 years, 5,052 (54%) are HEC incidents. Common types of HEC include human injuries and deaths, crop destruction, human threats/obstruction and other property destruction (KWS unpublished data). Through long-term elephant monitoring in the district, HEC conflict hot-spot areas have been identified with about 48% of the conflicts occurring in Siyapei, about 12% in Naroosura, about 17% in Lemek, about 8% in Naikara, about 8% in Nairekiankare, and about 75% in Entasekira (KWS, 2010). Over 80% of the reported incidents in these areas are crop damage by elephants. Due to human disturbance in these areas, elephants are restricted to very small forest pockets during the day and only move out at night to raid wheat and maize farms (Omondi, *pers. Comm*.). In this regard KWS ranger out-posts have been situated strategically in these areas for prompt response to HEC incidents.

Kenya Wildlife Service has previously tried various intervention options to resolve HEC in these areas with minimum success. Some of the interventions included helicopter drives, strategic fencing, moat constructions, education and awareness, mobile problem animal control (PAC) units and strategic location PAC outposts and resources. Translocation of the elephants was therefore considered as the most effective and sustainable option for mitigating HEC in Narok-North district. Translocation will greatly minimize HEC, reduce incidences of elephant mortalities and reduce expenditures on PAC.

Narok North District development plan (2008-2012) identifies agriculture as the main economic activity and has recommended translocation as the best intervention to address HEC. The current land tenure system which has allowed land sub-division from communal ownership to individual titles has led to habitat destruction. As a result, the future of elephants is bleak as the range would soon be entirely agricultural land. The KWS therefore proposed to address the HEC in this area by moving the entire Narok North elephant population to an appropriate and acceptable destination. This report therefore outlines the first phase of the elephant translocation exercise from Narok North to Maasai Mara. Lesson learned from the exercise and post translocation monitoring will be used during the planning for the second phase of the translocation exercise, particularly the release site.

2.0 Materials and methods

2.1 Study sites

Figure 1 below shows the capture and release sites of the translocated elephants. The elephants were captured at Narok north district, about 10 km from Narok town. This area has been described in details by Omondi (2011, *in preparation*). Two release sites were identified in Masai Mara National Reserve (MMNR), about 150 kilometers from Narok North district where the elephants were captured. The reserve occupies an area of approximately 1,510 km^2 and is located on the South-Western part of Kenya along the Kenya – Tanzania border between 1°13' and 1°45' south and 34°45' and 35°25' east. The biophysical environment of MMNR has been described in details by Otichillo (2000) and Said (2002).

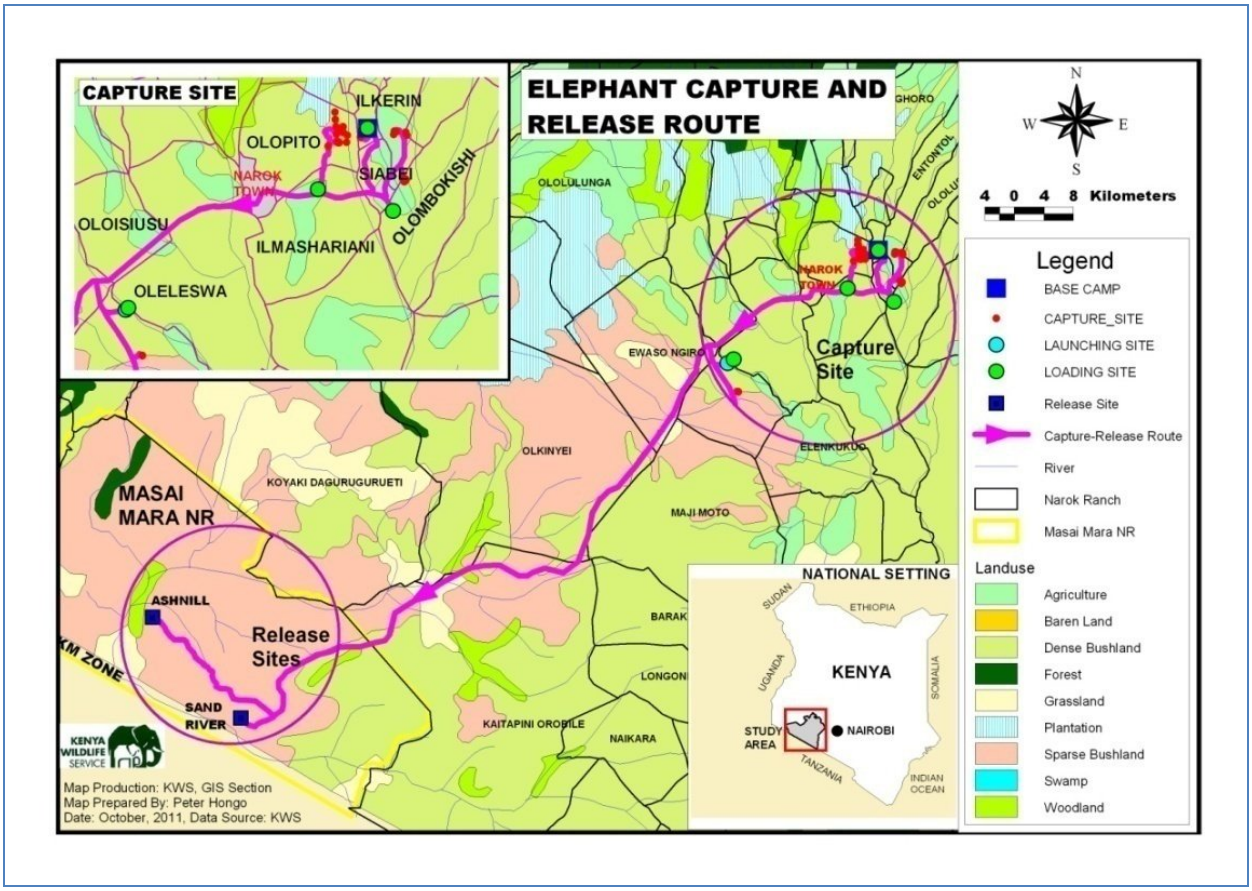

Figure 1: Map showing the capture and release site of elephants as well as the route from capture site to release site in Narok County.

2.2 Pre-translocation activities

Planning and preparation

Prior to the translocation, a series of planning and preparation meetings were held at KWS headquarters in Nairobi and Narok station. Five preparation meetings were held in Nairobi on various dates between 26th July and 16th September, 2011. Participation included veterinary officers, research scientists, wardens, procurement officers, pilots, mechanics and GIS specialists. During the meetings, logistical arrangements of various translocation activities were discussed. These included procurement of veterinary supplies and capture equipment, community sensitization, pre-translocation monitoring, capture and translocation process and post-release monitoring.

Translocation was to be carried out in two phases targeting 200 elephants from Narok North district to Masai Mara National Reserve. The first phase targeted to move about 50 elephants whereas in phase two, 150 elephants will be translocated. Intensive post release monitoring using GPS-GSM collars, aerial surveys and ground monitoring were to be used to provide information on the movement patterns of the translocated elephants. Information obtained from this first phase and post-translocation monitoring will be used to plan for the second phase of the translocation exercise.

Pre-translocation monitoring

Pre-translocation monitoring was undertaken through aerial census and ground surveys.

Aerial Survey: The aerial count at Narok North District was conducted from 31 August to 4 September 2011. The exercise started every morning at 0600hrs and ended late in the evening depending on the weather conditions. The aerial count followed the method described by Douglas-Hamilton (1996).The study area was divided into nine blocks. The blocks were of suitable sizes that could be flown in a day by one team. The average block size was 350km² (SE = ±445km²; n = 44). The smallest and largest blocks were about 84km² (block 7) and 663km² (block 9) respectively.

The blocks were each divided into 1km grids for use as transect lines during the count (figure 2). One aircraft, a four seater Cessna 182 was used during the aerial survey. The aircraft systematically searched for elephants in each blocks. It was flying at a height of about 100m from the ground. The aircraft flew on East to West directions along transects. Transects spacing in block 1 were 2km as the block consisted of crop fields. All the data recording, downloading and analysis followed the protocols described by Douglas-Hamilton (1996).

The data recorded included wildlife species numbers, carcasses, livestock, human settlements, water points, market centers, schools, crop farms, other human activities and their geographical locations. Photographs were taken of large herds to later verify the correct count. At the end of count session the GPS flight paths and waypoints were down loaded using DNR Garmin software. The front seat observer (FSO) did a summary table of each block and any double counts in the neighboring blocks were worked out and eliminated. The observation data sheets were then cleaned and entered into Microsoft Excel 2003/2007 for further analysis and presentation. ARGIS 10 software was used for plotting all the data collected and to generate distribution maps.

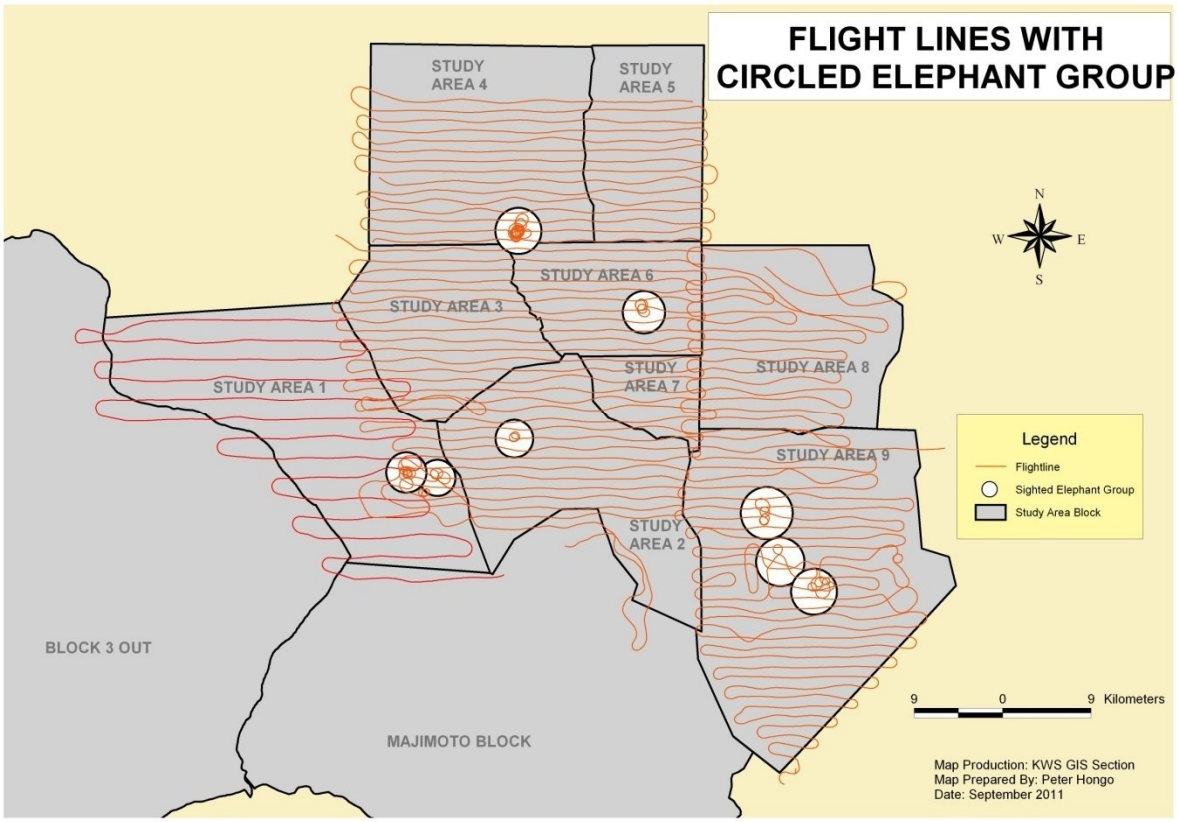

Figure 2: Flight paths used during the aerial survey of elephants, other wildlife, and human activities in Narok North District

Ground survey: Intensive foot and vehicle patrols were conducted in August and September 2011. The aim was to identify elephant herds, their distribution and sightings. The community was helpful in reporting elephant sightings, locations and group sizes.

Community sensitization

The community was sensitized about the translocation exercise through a workshop and meetings. A workshop between KWS and local leaders (councilors and chiefs) was held on 12 August 2011. During the workshop, aspects of the translocation exercise were discussed. The participants agreed that the elephants were to be translocated to Masai Mara National Reserve. This workshop was followed by a series of sensitization meetings in August and September 2011. The meetings were held in areas known to be hot-spot for human-wildlife conflicts. These areas included Siyapei, Olkeri, Erusiai, Olopito, Mashariani, Ntulele, Nturumeti, Katakala, Ololoito, Choracabori, Olengure and Olontoto. The meetings were conducted to ensure effective dissemination of information and to attain goodwill from the community. The facilitators explained in details the objectives of the translocation and made it clear to the communities why translocation was preferred. They were informed that a total of 200 elephants are targeted to be trans-located, with 50 elephants being targeted in the first phase. Generally the local communities were supportive of the idea of translocation. It was expected that the elephants might turn wild when being pushed to suitable areas

for darting and recovering. So the communities were advised to stay indoors during the exercise to avoid accidents. Further announcements were made through radios and newspapers to disseminate this important information. Traffic police were also notified for safety on the Nairobi-Narok highway and other roads.

Capture and release site identification

The main factors considered during the identification of the release sites in Mara included close proximity to water points, presence of habitat preferred by elephants, distance from the settlements, and good accessibility by the heavy transportation trucks. The two release sites were at Ashnil and along Sand River as shown in (Figure 1) above.

2.3 Translocation teams

The team undertaking the translocation was divided into three including spotting and selection, darting, and recovery teams.

Spotting team: This group comprised of a fixed wing Cessna aircraft, a pilot and two spotters. The team was airborne each day at 6:15a.m. The team flew to targeted area where it searched for herds of elephants. Upon sighting herds of elephants the pilot advised the ground crew to mobilize personnel and recovery equipment including tractors and cranes to a nearby location where the elephants darting operation and recovery will be undertaken.

The darting team: This group comprised of a helicopter, a pilot, a veterinary doctor, a cameraman, and a scientist. The pilot was in-charge of flying the helicopter and ensuring that the helicopter was in a position for veterinary doctor to dart the animal. The scientist selected the target herd as well as the specific animal to dart from the herd whereas the veterinary doctor darted the selected animal. The cameraman took picture during the darting operation.

The recovery team: The group comprised of veterinary doctors, capture ranges, scientists, drivers, and security rangers. This group was further divided into four units each comprising of one veterinary doctor, scientist, capture rangers, drivers, and security rangers. The doctors were responsible for attending to immobilized elephants and ensuring that they were in good conditions as well as reviving them onto the transport truck. In addition, the doctor took samples (ticks, blood and tissue) from the immobilized elephants. The scientists were responsible for taking measurements of the tail length, shoulder heights, head to tail length, ear circumference as well as fitting GSM-GPS collars. The capture rangers were responsible for loading the animals onto recovery tracks, escorting the animals and loading them onto the transportation trucks. The security rangers ensured there was security within the location of the immobilized elephants. The drivers were responsible for driving all the capture and translocation vehicles.

2.4 Sighting, darting and monitoring of immobilized elephant

The spotting team located target herds of elephants and informed the recovery team to move the equipments to a location close to where darting and recovery will take place. The spotting team continued to monitor the herds as the equipments were being moved in place. Once this was achieved

the spotting team called in the darting team to the location of sighted herds and ensured that the darting team has visual of the herds. Then, the darting team selected a herd to concentrate on. In case the selected herd was large, the darting team split it into small manageable family or bachelor units. The scientist in the darting team selected individuals to be darting from the group following a logical sequence. If it was a family, the matriarch was darted first followed by other adults. Young elephants in the family herds were the last to be darted. Cow-calf groups including sub-adults were preferably darted and transported together whereas adult bulls were darted and transported singly. The helicopter herded the elephants to suitable open grounds with favorable terrain close to the ground team for darting (plate 1).

Once an elephant was darted, the recovery team was called in but spotting team and sometimes the helicopter monitored the animal until if fell down. The recovery team was then directed to the fallen animal by the light aircraft or sometimes the helicopter. This team then started monitoring the animal and later after collecting samples and doing the measurements, the animal was loaded to a recovery truck. It was then transported and loaded to a transportation truck. This process was repeated until a good number of elephants (4 for bulls, and 10 for family herds) were achieved.

Plate 1: A helicopter driving elephants to open ground before darting. This is necessary so that the darted elephant can be easily recovered once immobilized.

Darting was conducted from the helicopter. Elephants were immobilized with 9.8 mg/ml Etorphine Hydrochloride (M99® Norvatis South Africa (Pty Ltd/ (Edms) Bpk) combined with Hyaluronidase to fasten the absorption and reduce the induction time. The dosage depended on the age of the elephant to be immobilized (table 1).

Table I: Dosage of combined Etorphine Hcl and hyaluronidase used to immobilize elephants during their translocation from Narok North District in September 2011

Age group	Etorphine Hcl (mg)/ Hyaluronidase (i.u)
Adult male	18/ 5000
Adult Female	16/ 5000
Sub adult	10/ 3500
Juvenile*	5/ 1500

**Elephant number 57 (a female aged 7 months) was physically restrained and 1mg Etorphine Hcl administered intramuscularly*

Three-milliliter Dan Inject® darts (Norvatis South Africa (Pty Ltd/ [Edms] Bpk) containing the appropriate dose of the drug with 2.2 × 60mm collared or plain needles were shot from a Dan Inject® rifle into the rump or thigh muscle. After darting, the veterinary doctor observed the darted animals for signs of narcosis. On average, induction time (time from dart impact to recumbency) was about 8 minutes. If no signs of narcosis were visible after 15 minutes the animal was re-darted.

A maximum of five elephants were darted at a time to allow for efficient monitoring, recovery and loading. Once the elephant fell and after ensuring adequate security in the area, the helicopter called in the ground team consisting of veterinarians, animal/laboratory technicians, capture rangers and scientists. On reaching the immobilized animal, the veterinarian examined the animal to ensure it was in a stable state of anesthesia and patent airways by straightening the trunk and removing obstructing objects. The immobilized elephant was also positioned in lateral recumbency to minimize pressure of the huge abdominal contents on the lungs.

Vital parameters including temperature, pulse rate and respiration rate were determined at 5 minute intervals and recorded using standard immobilization forms. Pulse rate was measured by palpating the middle ear artery, respiration rate by counting the frequency of air movements in the trunk and rectal temperature recorded (Gakuya *et al*., 2003). In addition oral mucosa was examined to monitor the level of tissue oxygenation.

Dart wounds were treated with antimicrobial ointment. Similarly the eyes were infused with antimicrobial ointment (opticlox®, Norbrook laboratories) to prevent desiccation of the cornea and covered by turning the ear flap over it. Overheated animals were doused with copious amounts of water particularly on the ears to keep them cool.

The elephants were examined for external injuries including wounds and foreign objects such as arrow heads as well as abscesses which were treated appropriately. A long acting antibiotic (Amoxicillin trihydrate 150mg/ ml or Oxyteracycline Hydrochloride 200mg/ml) was administered intramuscularly to the neck muscles in all immobilized elephants for prophylaxis against opportunistic infections following the stress of capture and transportation. Dexamethasone sodium 1% was administered to animals with septic wounds and those that ran too much before capture. Animals that manifested compromised respiration were given 400mg of doxapram intravenously.

2.5 Sample collection

Forty milliliters of blood were drawn from the superficial ear veins in sterile syringes and dispensed into plain and EDTA-coated tubes. EDTA blood samples were used for hematological analysis and the rest preserved in liquid nitrogen at – 196 °C for genetic studies. Serum was harvested from the plain tube blood samples by centrifugation after several hours of standing to allow for clot formation. The serum was aliquotated and preserved in liquid nitrogen for various serological tests. In addition, tusk scrapings and hair roots were also taken and preserved for various studies. Fecal samples were collected from the rectum for parasitological analysis. Tick samples were also collected from various body parts for identification and recording.

2.6 Measurements

Various body measurements were taken to aid in elephant identification and post release monitoring. These included trunk length, back length, tail length, shoulder height, spoor diameter, ear diameter, tusk circumference and lip circumference. Notable features were documented such as notches, holes and slits on the ear and missing or broken tusks. Photographs of ear venation and tusk appearance were taken. Plastic zip tags were fitted on the tails of immobilized elephants (Plate 2a). In addition elephants were numbered using water proof paints to aid in post release monitoring (Plate 2b).

Plate 2a: Plastic zip tag on the tail

Figure 2b: Elephant with a number

2.7 Recovery, loading and transportation

Immobilized elephants were loaded into recovery trucks and tractors using cranes and transported to the loading site. They were then transferred to a conveyor belt from where they were loaded to a transportation truck (Plate 3a and 3b). Animals were maintained in narcotized state during recovery and transportation to the loading site by administering Etorphine Hcl (M99®Norvatis South Africa (Pty Ltd/ (Edms) Bpk) intravenously into superficial ear veins when they showed signs of recovery. Signs of recovery included increased rate and depth of respiration, increased frequency of movement of the trunk and the ears as well as paddling of the legs. Maintenance dose was calculated as a quarter of the initial darting dose depending on the age group.

At the loading site, conveyor belts were used to move the immobilized elephants into a recovery crate. Here the elephant was revived from neurolepto-analgesia by intravenous administration of Diprenophine Hcl (M50-50®Norvatis South Africa (Pty Ltd/ (Edms) Bpk) at a rate of three times the initial dose of Etorphine administered. In addition, a tranquillizer, Azaperone tartate (60 - 120mg depending on the size of the animal) was administered intramuscularly to keep the elephants calm during transportation. The animal was monitored until it was fully revived before it was prodded to move into the transportation truck.

Plate 3: Elephant being loaded onto a conveyor belt for onward transfer into the transportation truck. A: Elephant being loaded to a conveyor belt using a crane. B: Elephant being loaded from the conveyor belt to the transportation truck.

2.8 Release

At the release site, the transportation truck was reversed into an offloading ramp and the elephants allowed to voluntarily walk-out of the crate (Plate 4).

Plate 4: Elephants walk out of the truck at the release site in Masai Mara National Reserve

3.0 Results and Discussion

3.1 Pre-translocation aerial survey

Twenty five flight hours were spent of which 18.8 hours were for actual counts. A total of 310 km² were covered during the survey. This represents a search effort of about 16km^2 hour^{-1}. A total of 5484 observations were made during the aerial survey, where 79.9% of the sightings were livestock. A total 225 elephants were counted during the survey distributed in 11 herds ranging from 6 to 92 individuals in each herd (Figure 3). Two herds, one in Nkareta and another in Siyapei, constituting 48 and 92 individuals respectively were encountered in high human settlement and crop farming zones. Seventeen other wildlife species were sighted, and counted during the survey. Buffalo, Grant's and Thompson's gazelles, wildebeest, hippopotamus, zebra, giraffe and eland amongst others were the wildlife species encountered (Mijele *et al.*, in preparation). Of the total livestock encounters 58.1% were shoats (goats and sheep), while cattle constituted 21.3% (Mijele *et al.*, in preparation). The presence of elephants in areas with crop farming as the main type of land use has resulted to high HEC in Nkareta and Siyapei area of Narok North District. Research in other areas with similar characteristics indicates high HEC (Transmara: Sitate *et al.*, 2003).

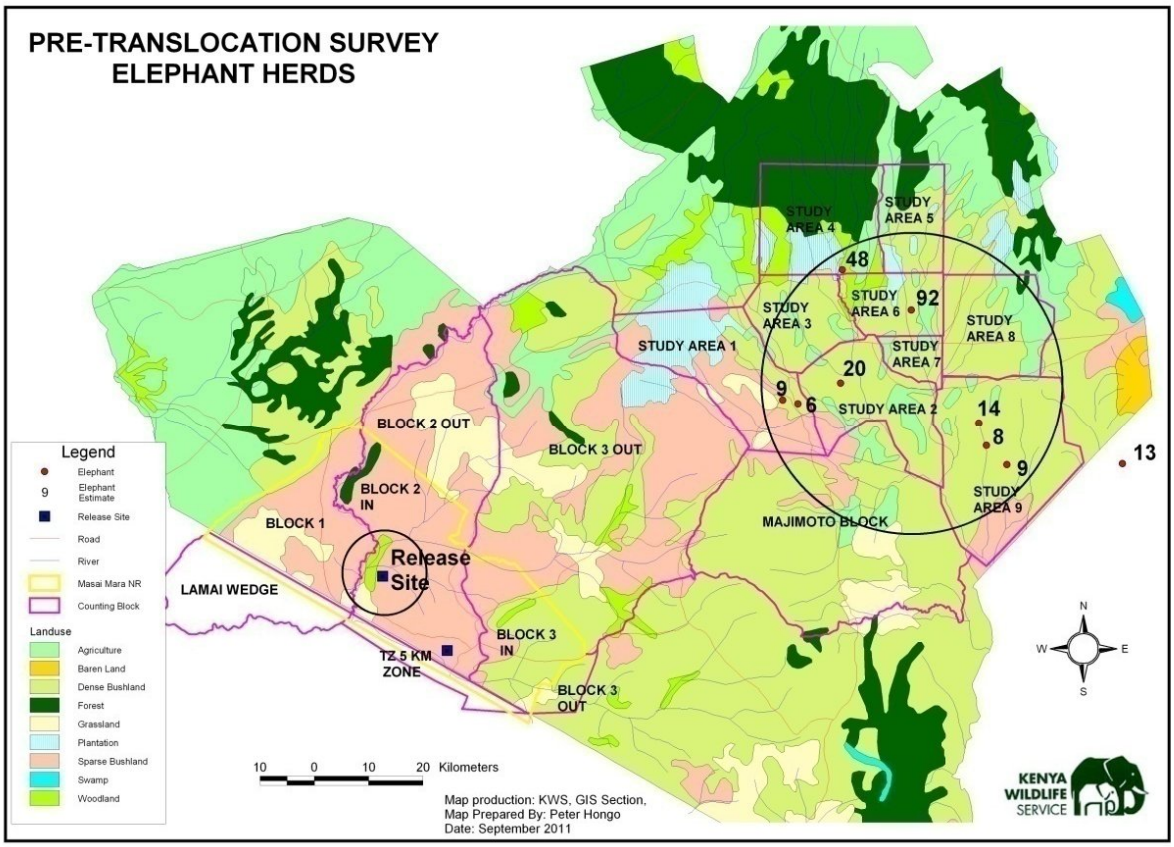

Figure 3: A map showing the distribution of different herds of elephants in Narok North District.

5.2 Translocation

Sixty four elephants were darted, out of which 62 were recovered (Table 2). Two elephants were immediately revived because they fell in difficult terrain which could not be accessed by recovery vehicles. They were monitored until they united with their respective herd mates.

Elephant EL_ID 62 (Female, 11years [±1]) died during transportation to the Maasai Mara due to capture related complications. The condition described as pink froth syndrome (Gakuya *et al*., 2003) is characterized by severe respiratory distress, edema of the lungs and discharge of blood tinged fluid from the trunk following capture. The complication which started after the elephant had been recovered started as the animal was being transported to the loading site. It had fallen in a difficult terrain which was very rough for the recovery truck. There was a significant difference in morphometric measurements between females and males ($F=6.624$, $P < 0.05$, $n=62$), with females having higher measurements. From the age classes 10-35 years, females had higher morphometric measurements when compared with males (table 2).

Table 2: Age, sex and morphometric measurements of elephants translocated in Narok County

Age class	SEX	Number	Shoulder Height	SD Shoulder height	Back length	SD back length
0-4.9	F	3	156	±41	173	±47
	M	8	162	±15	178	±23
5-9.9	F	7	203	±22	214	±27
	M	9	203	±26	227	±34
10-14.9	F	5	232	±18	228	±26
	M	7	216	±12	222	±25
15-19.9	F	3	255	±25	290	±17
	M	4	222	±62	264	±23
20-34.9	F	12	266	±23	294	±21
	M	3	262	±26	280	±10
35+	M	1	280	-	360	-
Total		62				

SD = Standard deviation

5.3 Trans-located elephant population structure

Before capture, the trans-located elephants were either in groups composed of female family herds or bachelor herds. Out of the 62 trans-located elephants, about 44% consisted of young individuals whose age was less than 10 years (figure 7). Only one male was aged over 40 years. The sex ratio of the translocated elephants was almost a 1:1 as males and females were 32 and 30 individuals respectively

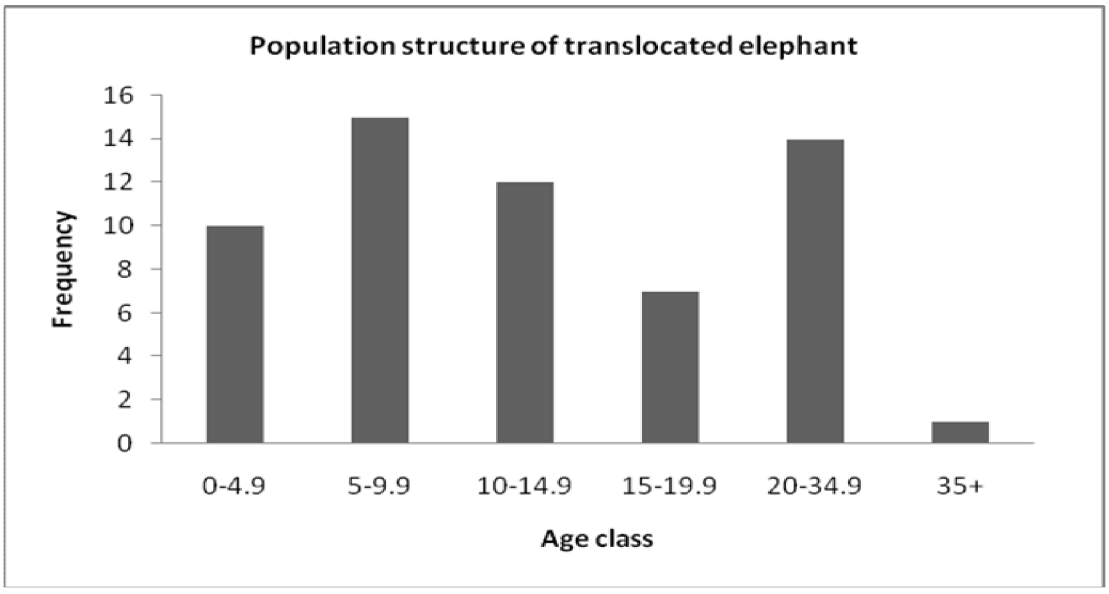

Figure 7: Histogram of elephants translocated in Narok county showing their population structure

5.4 Post release movement patterns

Five elephants were collared during the trans-location. After release collared elephants displayed an effulgent movement pattern (figure 8). EL_ID 1, Olkeri, a female, was released at Ashnil release site and moved North West, an approximate straight distance of approximately 64km at 335.08 degrees bearing to Kisii, where it was killed by the community. EL_ID 7, Olenashuu, a male, released at Sand river release site, moved North North-East for an approximate straight distance of about 43km at 15.63 degrees bearing to Koyiaki group ranch. This individual has since settled covering approximately 3.3km per day in no particular direction. EL_ID 21 and EL_ID 32, both females, have moved south to Tanzania, at approximate distance of 29km and 50km respectively, into Serengeti National Park. After release, the elephants moved fast in the initial 24 hours only to settle down later.

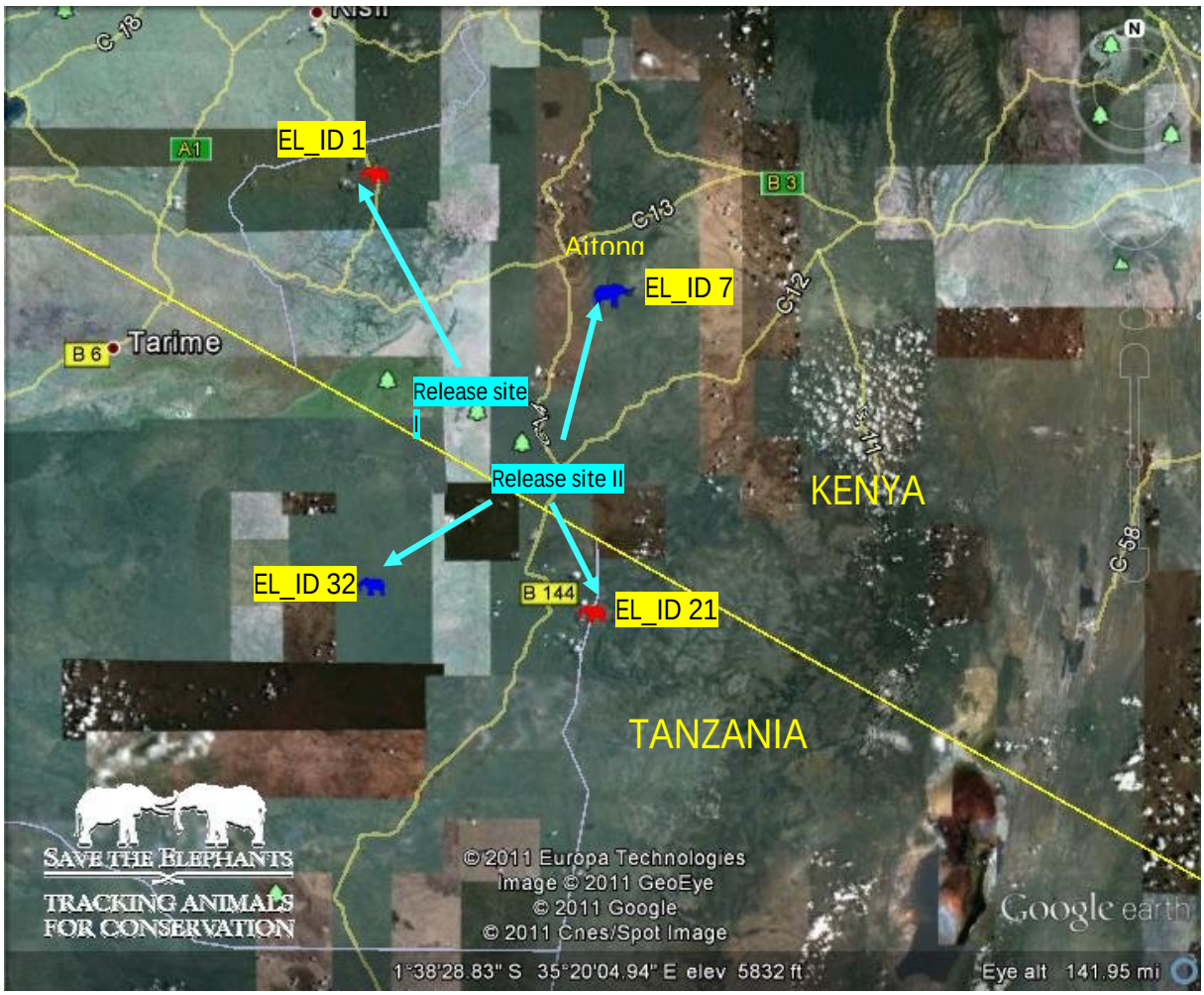

Figure 4: The location of four collared elephants (EL_ID1=Olkeri; EL_ID7= Olenashuu; EL_ID21= Siyapei; and, EL_ID32=Marima). Data is for the period up to 14 October 2011.

The collared elephants were translocated in groups of 2, 4, 7 and 10 (table 3). Five groups (four females and one male) had a collar deployed to an individual in the group. The collared male was in

a group of four males. The collar on EL_ID 1 was retrieved, after she was slain, and re-deployed on to EL_ID 38. The collar has not sent any fixes after the re-deployment.

Table 3: Details of collared elephants and their groups during the translocation exercise

Elephant ID	Name	Sex	Group composition*				Collar frequency	Collar ID	Current status
			M	F	J	T			
EL_ID 1	Olkeri I	Female	0	1	1	2	148.140	AG 590	Both slain and collar put to EL_ED 38
EL_ID 6	Olenashuu	Male	2	0	2	4	150.730	AG591	Stable
EL_ID 21	Siyapei	Female	3	2	5	10	148.070	AG 589	Stable
EL_ID 32	Marima	Female	2	2	4	7	148.050	AG 588	Stable
EL-ID 38	Olkeri II	Female	5	3	2	10	148.140	AG 590	NO transmission

**Key:* M=Male; F=Female; J=Juvenile; T=Total

6.0 Challenges

Some of the challenges encountered include:

- Mechanical breakdown of vehicles and capture equipment
- Rough terrain and poor road network
- Poor collar data transmission.
- Limited capacity of capture and monitoring equipment for instance low loader truck and cranes

7.0 Conclusion and way forward

7.1 Conclusion

The translocation exercise was successful with 62 elephants being moved. We surpassed the 50 elephants targeted for translocation in the first phase with 4.8% (n = 3) mortality recorded during and immediately after the capture. During the capture and loading phase, no animal was lost. However, during the transportation phase one elephant died as it had developed pink froth syndrome and two others were killed by communities when they strayed into non-elephant range area.

7.2 Way forward

The following is suggested as the way forward:

- Results of post release monitoring of translocated elephants should be used to plan for Phase II of the exercise particularly in deciding on the recipient site.

- The second phase should be undertaken during the dry spell just as in the first phase so as to enhance movement of the trucks
- Five more collars should be procured for the second phase so as to enhance post release monitoring
- Equipment for the post release monitoring e. g., field glasses and cameras should be procured well in advance before the next translocation phase
- A quick response team be set up to monitor the released animals as they settle in their new home

Post release monitoring will involve:

Satellite tracking: Four herd representative elephants were selected and fitted with GSM-VHF collars. Of these, one was a dominant male in a group of 4 other males, while the others were fitted on second in-charge females of the trans-located groups. The collars were set to produce fixes at an hourly interval.

Aerial recce: Monthly aerial recce are planned to be conducted using a Cessna four seater aircraft. During the recce, elephant herds encountered will be recorded and geo-referenced. This will aid the ground patrol team in locating elephant herds to identify trans-located individuals.

Direct observation and scout involvement: For identification of the trans-located elephants each individual was fitted with a black tag approximately 1ft long, on the tail. Additionally all the elephants were numbered with white oil based paint at the rump, as illustrated above. Unique features from each individual were recorded and photos taken for poster development. A poster with ID features of the trans-located elephants will be developed and distributed in lodge reserve's gates and conservancy head quarters to aid scouts, rangers and tourists identify the elephants and report.

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