

# Elephant Partners

*ElephantVoices conservation initiative Maasai Mara*

Year End Report  
2014



## Introduction to Who’s Who and Whereabouts Databases

ElephantVoices developed searchable and publicly accessible *Mara Elephants Who’s Who & Whereabouts Databases* (<http://www.elephantvoices.org/maraelephants-whos-who.html>; <http://www.elephantvoices.org/maraelephants-whereabouts.html>) with a mapping presentation (<http://www.elephantvoices.org/maraelephants-mapping.html>) to permit citizens to participate in the monitoring of elephants. Using the *Mara EleApp* (<http://elephantvoices.org/mara-eleapp.html>) as a tool for mobile data collection, storage and upload, these databases now house geospatial information on elephants across the ecosystem collected by close to 250 residents and visitors. By end 2014 over 3,500 records of elephant sightings, sick and wounded animals, signs of elephants, and mortalities had been uploaded and more than 1,200 (>10 years) elephants had been identified and registered.

All data uploaded are verified, updated and corrected, where necessary, by ElephantVoices staff via the databases’ backend. The online databases and the *Mara EleApp* for Android-based smartphones were conceptualised and designed by ElephantVoices, and programmed by Verviant Consulting Services in Nairobi (<http://verviant.com>).

## Cumulative Results

### The participants

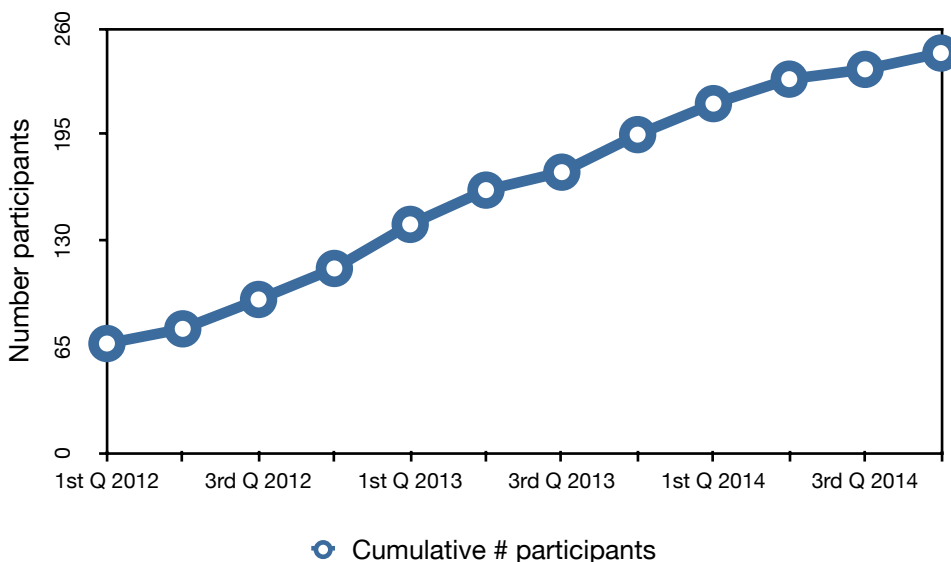
As of end 2014 245 different individuals had contributed data to the online databases (Figure 1). Participants include guides, tourists, members of the community, volunteers, conservancy representatives, Kenya Wildlife Service representatives, SORALO scouts, researchers and others. The system is set up so that people can collect data via the *Mara EleApp* (available [on the Android Market](#)) and, once registered, they can upload their observations from their smartphone directly to the [Mara Elephant Who’s Who & Whereabouts Databases](#). Alternatively they can enter observations and photographs online via “My Observations”, based on the same registration process.

The bulk of observers have been African Impact volunteers based at Mara Naboisho Conservancy, under the guidance of Lincoln Njiru (Table 1). However, Mara residents have been individually responsible for many more uploads. Two participants have been students who have carried out data collections as part of their degree program. One of these individuals is KWS Maasai Mara Research Scientist, David Kimutai, who is working toward a Masters degree at Moi University and the other is Alfred Mepukori, an undergraduate student at Maasai Mara University. Four individuals have been interns from the Diploma Course at Maasai Mara University.

Table 1. Participants include volunteers from African Impact (AI), Member of the local community (Com), Conservancy Representatives (CR), ElephantVoices (EV), Guides, Kenya Wildlife Service (KWS), Mara Elephant Project (MEP), Researchers (R), SORALO (SOR), Tourism Operators (TO), Tourists (Tourist), and Other (film makers, etc).

AI	Com	CR	EV	Guide	KWS	KGS	MEP	NGO	R	SOR	TO	Tourist	Other
166	15	10	2	22	1	0	3	2	4	3	2	13	2

Figure 1. The cumulative number of participants.



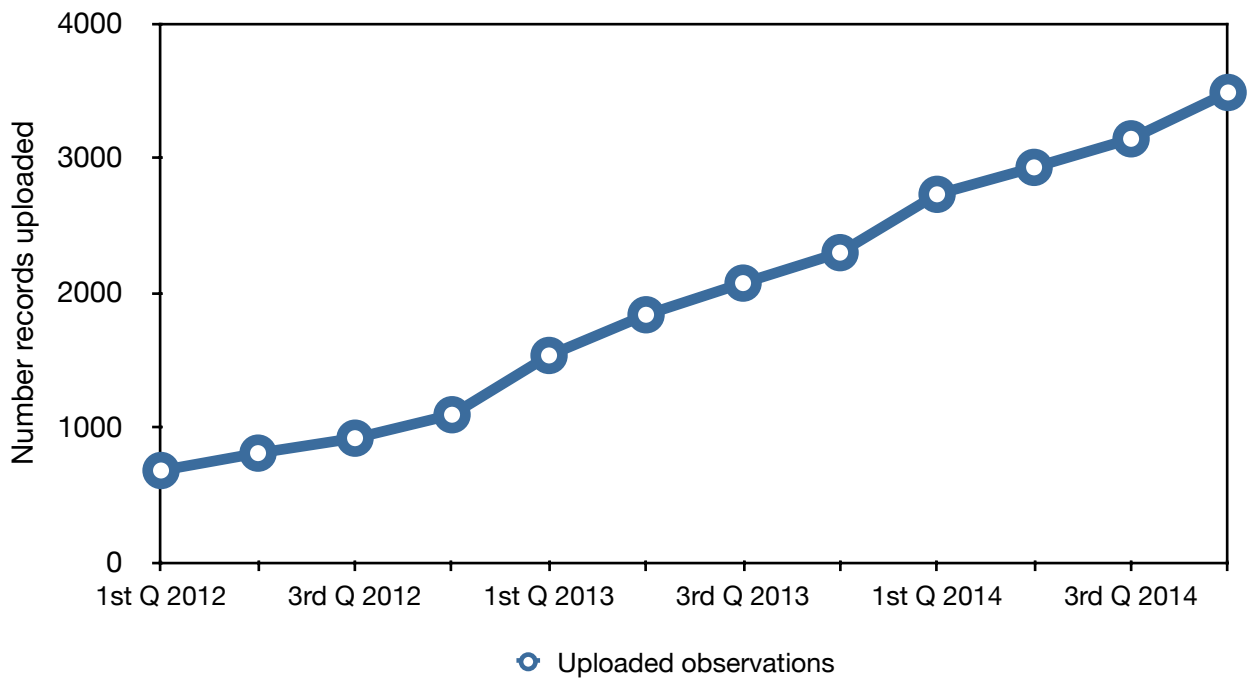
**The observations**

As of 31 December 2014, 3,487 elephant sightings had been uploaded to the Whereabouts Database (Table 2). The sightings consist of single males and bull groups, family groups with or without associating males and groups of unknown type. In addition, 102 mortalities had been uploaded and 503 signs of elephants. Figure 2 shows the cumulative number of uploaded observations at each quarter to end 2014.

Table 2 Number of elephant sightings, signs or mortalities uploaded as of 31/12/2014.

Group Type	Number of observations
<b>Total</b>	<b>3487</b>
<b>Elephant Sightings</b>	<b>2882</b>
Single males and bull groups	704
Family groups with or without associating males	2121
Unknown type	57
<b>Elephant Mortalities</b>	<b>102</b>
<b>Elephant Signs</b>	<b>503</b>

Figure 2. The cumulative number of uploaded observations through to end 2014.



**The Mara elephants Who's Who: Numbers and sex ratio**

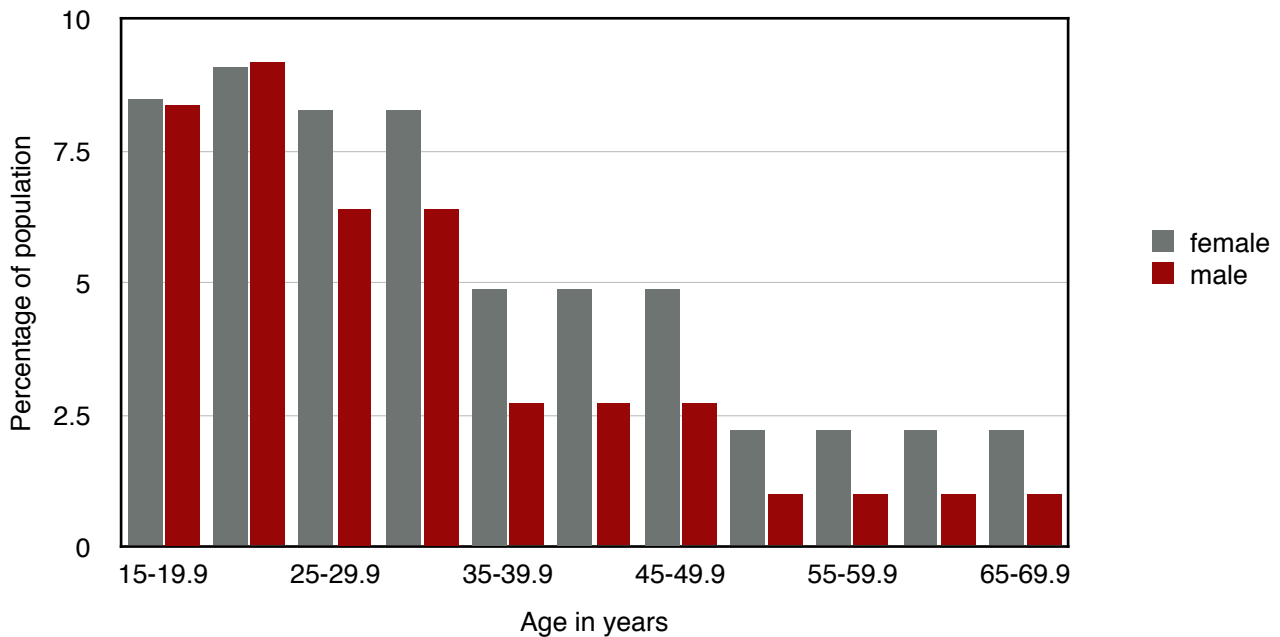
The Who's Who Database is fully searchable. An elephant may be identified by selecting a number of traits (sex, age, home area, ear, tusk, tail and body characteristics) that best describe the elephant and which are defined and presented in a number of slideshows available through the [Features Guide](#).

As of 31 December 2014 a total of 1,214 elephants had been identified, individually characterised, given an age estimation and been registered on the [Mara Elephants Who's Who Database](#). Of these 1,150 were adult elephants

( $\geq 15$  years), with 664 (58%) being adult females and 486 (42%) being adult males. The skew toward females mirrors the imbalance seen in the mortality figures (see Elephant Mortality data below in which 65% of mortalities were male) and indicates the high level of male attrition caused by ivory poaching (due to males have significantly larger tusks) and human elephant conflict (males seek out areas of high biomass and high value crops to meet growth demands).

Figure 3 shows the age structure of the elephant population using the Mara ecosystem based on individually registered elephants. The skew in the sex ratio increases with age such that among elephants 35-49 years old only 35% is male, and over 50 years only 29% is male. Based on surveys the ratio of adult females ( $\geq 15$  years) to immature elephants is 1:2, therefore, the total number of elephants accounted for through individual registration is 2,478 (486 adult males + 664 adult females + 1328 immatures).

Figure 3. The Age structure of the elephant population using the Mara ecosystem  $N=1,150$ .



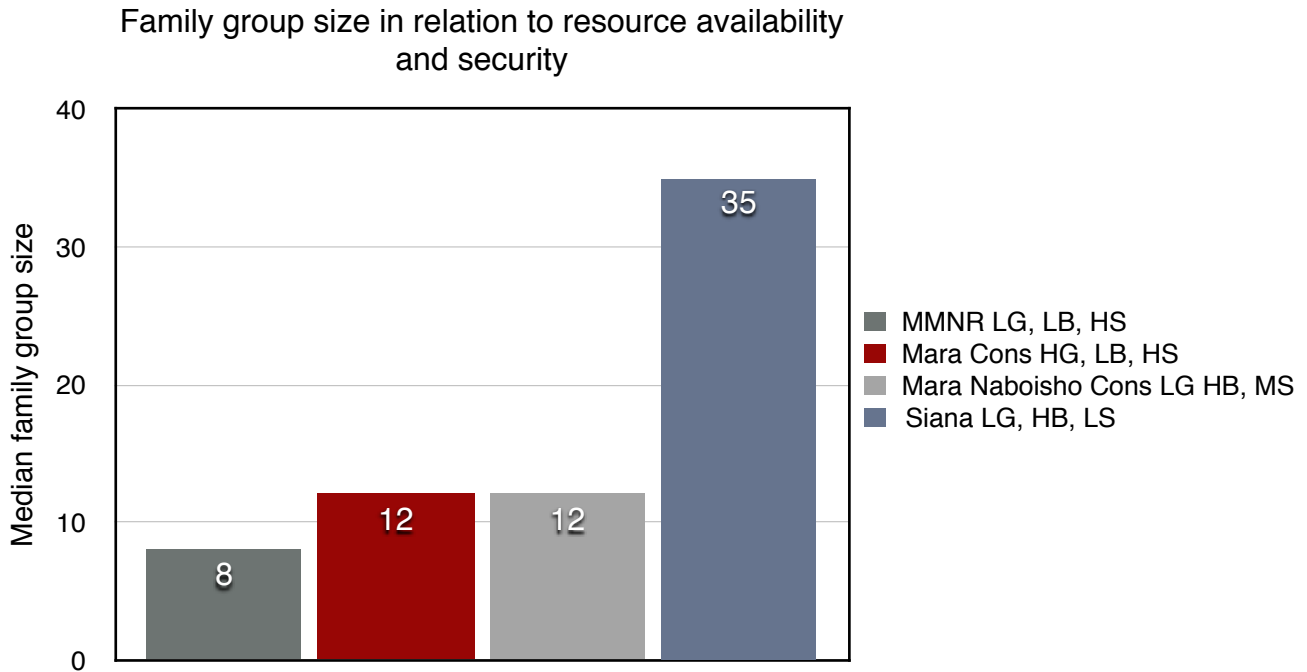
**Elephant habitat preferences – group type and group size:** Elephants are found in four types of groups: a) lone male; b) all-male; c) family; d) family with associating males. In the Mara ecosystem groups may vary in size from one to over 300 individuals. These different group types and sizes are not randomly dispersed in the ecosystem, but are distributed in relation to perceived opportunities and threats. The median group size of family groups (with and without accompanying adult males) varies across different areas in the ecosystem as does the level of security and the degree of grazing competition from livestock (Table 5). High pressure from livestock tends to increase competition for grazing and reduce elephant group size. Insecurity will be apt to cause elephant groups to coalesce to form larger aggregations.

#### Elephant families

Elephant families gravitate to areas offering both security and enough forage (grazing/browse) to permit them to feed in close proximity to other family members. Where food is in short supply families are forced to fragment into smaller groups; when grazing/browse is plentiful or when insecurity is high families aggregate to form larger groups.

For example, while MMNR and Mara Conservancy offer similar grassland habitat and good security, the northern and eastern parts of the MMNR offers very little forage for elephants due to night livestock grazing. As a result, family groups are significantly smaller in the MMNR (median 8;  $n_B=355$ ) than across the river in Mara Conservancy (median 12;  $n_A=568$ ) (Man Whitney  $U_A=68401.5$ ;  $U_B=133238.5$ ,  $Z=8.23$ ,  $P<0.0001$ ; see Figure 4). Siana and Mara Naboisho Conservancy represent similar high browse habitats, but whereas Mara Naboisho offers decent security (significant number killed on or close to its boundaries, having died inside), Siana is highly insecure (see mortality data below) causing families to seek safety in numbers. Family groups are significantly larger in Siana (median 35;  $n_B=113$ ) than on Naboisho (median 12;  $n_A=726$ ) (Man Whitney  $U_A=67434$ ,  $U_B=14606$ ,  $Z=-11.02$ ,  $P<0.0001$ ; see Figure 4).

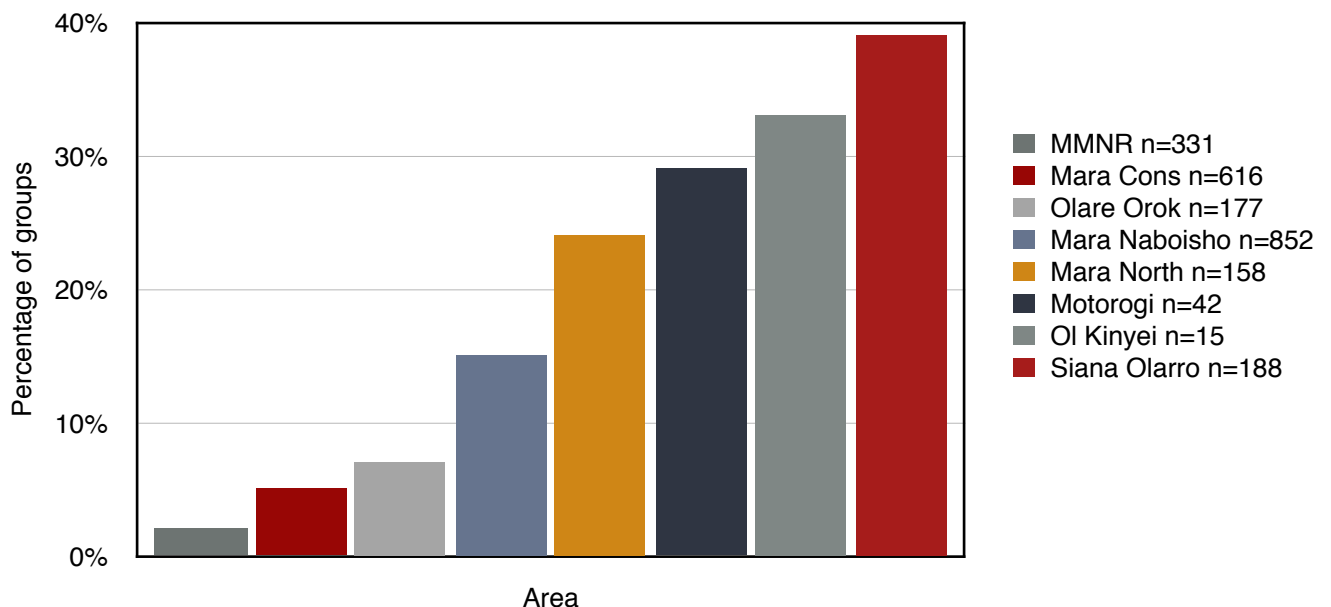
Figure 4. Median family groups size in Maasai Mara National Reserve (MMNR), Mara Conservancy, Mara Naboisho Conservancy and Siana in relation to high and low grass availability, high and low browse availability and high and low security.



Males

Male elephants grow to be twice the weight of female elephants and require areas of high biomass to meet their growth demands. Their need for browse can be seen in the proportion of all male groups observed in the different areas. All-male groups are typically *not* found in grassland areas of MMNR, Mara Conservancy, or Olare Orok Conservancy, but depend on those conservancies (and beyond) that are predominantly bushland (Mara Naboisho, Motorogi, Ol Kinyei Conservancies and areas such as Oldonyo Erinka, the Pardamat Hills, Siana, Maji Moto), or areas near to crops (e.g. Mara North Conservancy). Figure 5 shows the percentage of groups sighted in different areas that were all-male (excluding lone males), and illustrates the dependence of males on areas outside the MMNR and Triangle. Sexually active males (often alone or with families) are, by contrast, are found wherever there are family groups. Though males are more inclined to take risks than are females, they too appear to aggregate in areas with high levels of poaching. Similar to cow/calf groups all male groups are significantly larger on insecure Siana (median=5,  $n_B=73$ ) than they are on Mara Naboisho (median=3,  $n_A=128$ ) (Man Whitney  $U_A=6629$ ;  $U_B=2715$ ,  $Z=-4.93$ ,  $P<0.0001$ ).

Figure 5. Percentage of groups by area that were all-male.



**Mortalities**

Up to the end of 2014 a total of 102 mortalities had been uploaded to the database. Overall the proportion of illegally killed elephants (PIKE) was 91%. Of all mortalities uploaded one was in 2010, two in 2011, 32 in 2012, 35 in 2013 and 31 in 2014. Twenty-one were female, 70 were male and 11 were of unknown sex. Of those of known sex, males accounted for 77%.

Of those reported illegally killed (93) four were reported to have been killed by poisoned arrows, 26 were shot and 56 were speared; the remaining seven were of unknown means. Spearing was concentrated on the outskirts of the MMNR, while the majority of elephants shot were in and around the Naimina Enkiyo Forest (13 in the forest and 2 in Mosiro) and in the area representing the confluence of Siana, Maji Moto, Naikarra (6). Another four were uploaded from Olosokuan in Tanzania.

The mortalities uploaded to the Who’s Who and Whereabouts databases represent only a portion of the total mortalities as the majority of elephant deaths are reported to the Mara Elephant Project and/or directly to KWS. To understand the overall picture it is necessary to look at the combined data of ElephantVoices, Elephant Aware, Save the Elephants, Mara Elephant Project and Kenya Wildlife Service.

In late 2014 ElephantVoices data (including Elephant Aware and SORALO) were harmonised with those collected by the Mara Elephant Project and Save the Elephants and we are awaiting the opportunity to fully harmonise these with Kenya Wildlife Service. These data were presented by Iain Douglas-Hamilton at a meeting held at Kenya Wildlife Service on February 18 and 19, 2014. At this meeting we agreed that moving forward we would submit any mortalities to the Regional Warden and that KWS would meet with us on a quarterly basis to harmonise and share the resulting data.

Figure 6. illustrates the number of dead elephants by cause across five years 2010 through 2014 and the overall PIKE figures across these years. It shows that while 2012 was the worst year, the PIKE remains very high and, at over 70%, is well over the sustainable limit of 54%.

*Figure 6. The number of dead elephants by cause and the overall PIKE level in the Mara ecosystem (courtesy of ElephantVoices, Elephant Aware, Save the Elephants, Mara Elephant Project and Kenya Wildlife Service).*

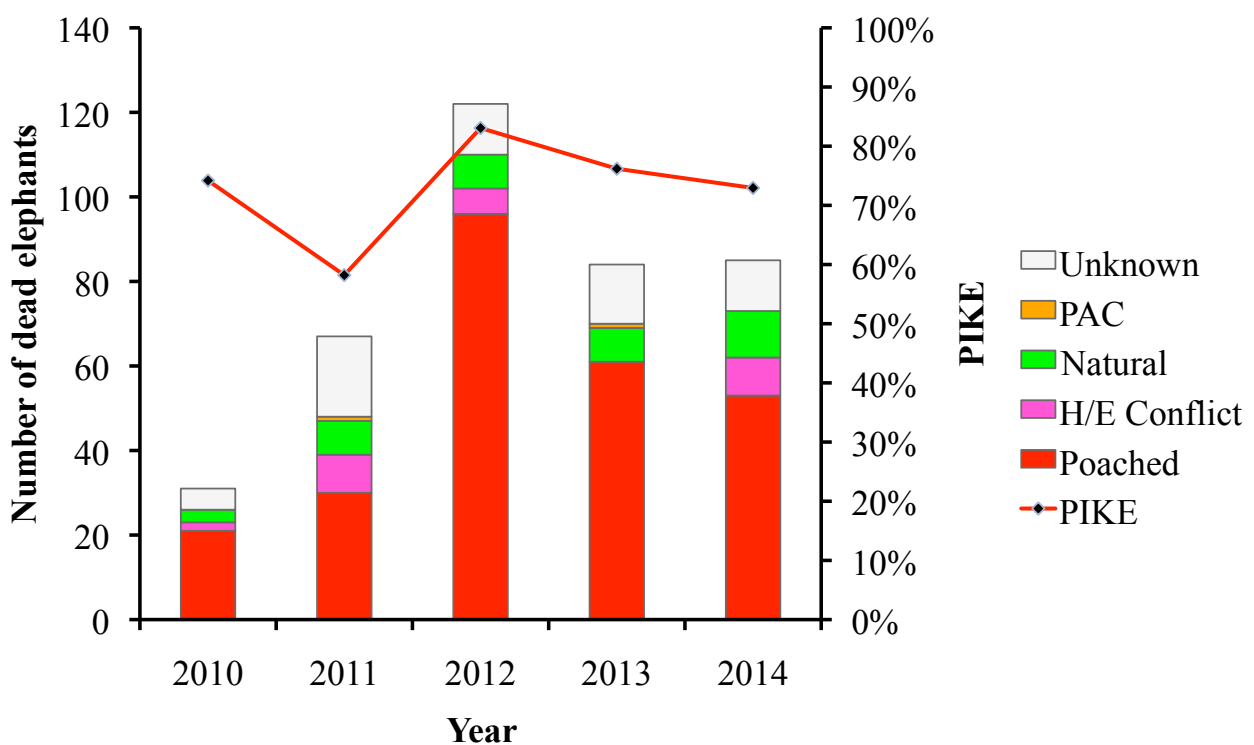


Figure 7 illustrates the distribution of all mortalities collected in the Mara ecosystem between 2010 and 2014 (excluding additional data collected by KWS). As can be seen, the illegal killing of elephants is concentrated outside the MMNR and is higher in the northeast and east. Dividing the ecosystem into “areas” to examine PIKE (see Figure 8) it is clear that the PIKE is declining in some areas, while PIKE levels remain exceedingly high in other areas.

Figure 7. The distribution of elephants carcasses from 2010 through 2014 (Courtesy of ElephantVoices, Elephant Aware, Save the Elephants, Mara Elephant Project and Kenya Wildlife Service).

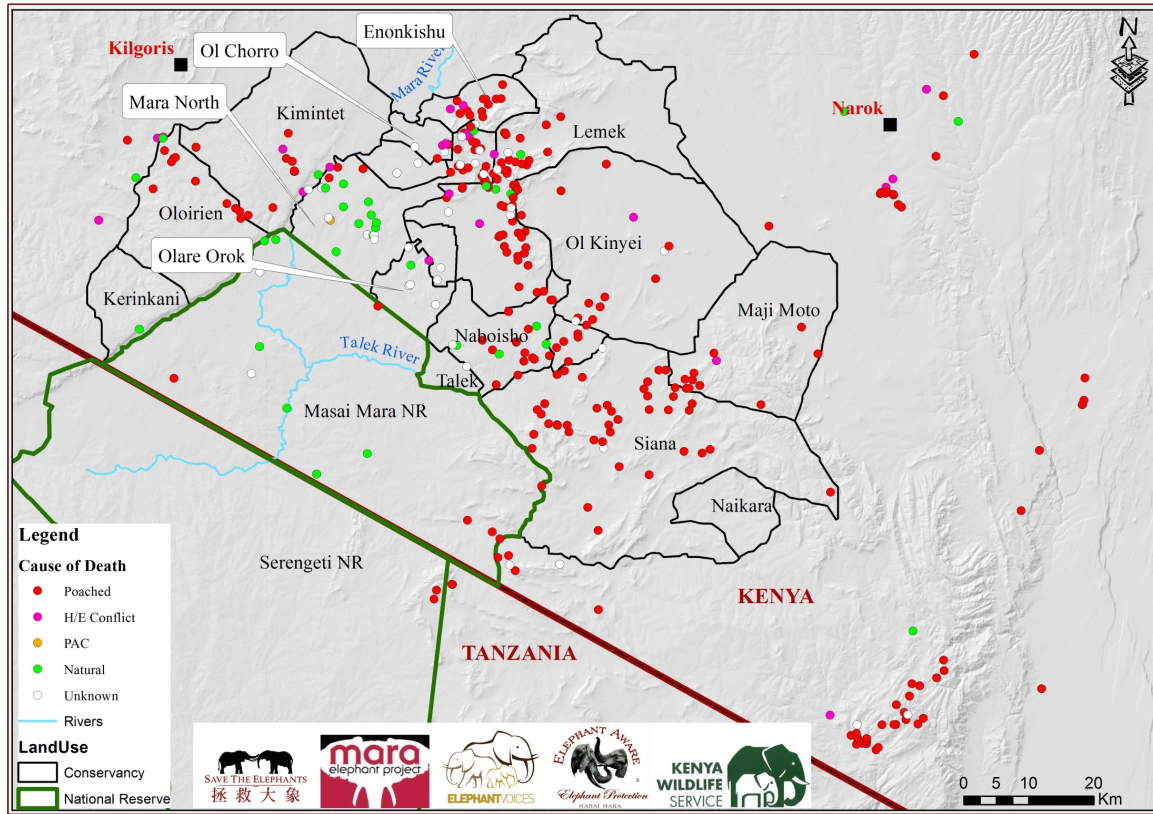
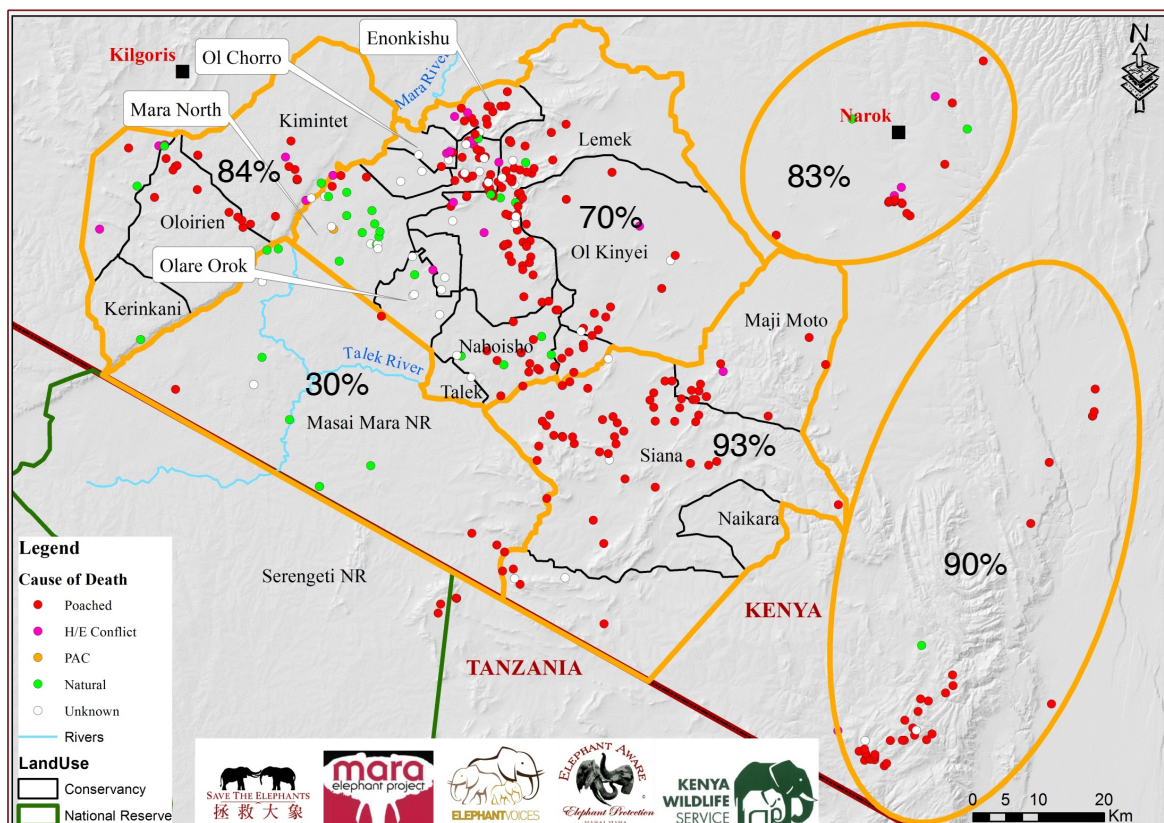


Figure 8. The distribution of PIKE by area (Courtesy of ElephantVoices, Elephant Aware, Save the Elephants, Mara Elephant Project and Kenya Wildlife Service).







### ***Human settlement and routes of elephants***

Using Google Earth Pro images from 2013 we are continuing a process of mapping human settlement around the Mara ecosystem. These can be seen as white polygons in Figure 9. We have requested an update to the 2015 images in which we expect to see a substantial increase in the number of settlements. We are working with Save the Elephants and Mara Elephant Project to map the primary routes used by elephants to move from one protected area or conservancy to another. We are doing this by 1) individually drawing the most used routes of each satellite collared elephant (n=22), as well as the key paths they use to move on longer 'safaris'; 2) amalgamating these and simplifying them to show the salient routes; 3) adding the data that ElephantVoices has gathered via the collection of signs of elephants (see above); and 4) information gathered systematically by speaking to members of the community.

### **Implications of the data for elephant conservation and management**

The above mentioned exercise is part of the scientific basis for a report we are preparing to present to Narok County on the threats to connectivity in the ecosystem and the consequences for elephants, other wildlife and people. In the report we look at the human settlement footprint, elephant mortality, human-elephant conflict, livestock grazing in the protected areas and how these together are affecting the status, grouping patterns, distribution and movement of elephants in the Mara ecosystem. ElephantVoices is preparing this document together with Save The Elephants and Mara Elephant Project, and engaging with many other stakeholders in the process. The report will discuss the implications of the data for elephant conservation and management in the Mara ecosystem and make recommendations to the County. We do not wish to preempt that report by discussing our results in more detail here.

This Year End report from Elephantvoices is the last report from the main phase of our Mara elephant conservation initiative, with the above mentioned upcoming report as one of its main outputs.

### **Acknowledgements**

ElephantVoices conservation initiative Elephant Partners, and Mara Elephant Who's Who and Whereabouts databases, have been operative for over three years. During this period the project has been supported by the JRS Biodiversity Foundation, Conservation Trust of the National Geographic Society, the Northern Europe Global Exploration Fund of the National Geographic Society, Liz Claiborne Art Ortenberg Foundation (LCAOF), Fondation Franz Weber, A&K Philanthropy, IFAW, Friends of Conservation, Google, and many generous individuals. The success of this initiative depends upon the volunteer participation of many people whose names and affiliations appear online. We are grateful for the broad support that has been received.

ElephantVoices, Joyce Poole/Petter Granli, 28 March 2015

[info@elephantvoices.org](mailto:info@elephantvoices.org)

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