Elephant Partners

Elephant conservation initiative Maasai Mara

Quarterly Report (1)

by

ElephantVoices

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Introduction to Elephant Partners

Using web-based technology, ElephantVoices has developed a unique model for citizens to monitor and protect elephants. The *Mara EleApp* (http://elephantvoices.org/mara-eleapp.html) permits the collection and upload via cell-phone of geospatial, group size and association data to the searchable, publicly available *Mara Elephant Who's Who & Whereabouts Databases* (http://www.elephantvoices.org/maraelephants-whos-who.html; http://www.elephantvoices.org/maraelephants-whereabouts.html) with Mapping functionality (http://www.elephantvoices.org/maraelephants-mapping.html). A registered user can submit the same type of data online with one or more photographs.

Our aim is to use this system to grow a dedicated, caring community of guides, scouts, researchers, photographers, and tourists who will collect data on, share information about, and work together to sustain the Mara elephants and to inform conservation management. ElephantVoices will nurture and train these "citizen scientists" expanding their numbers via on-the-ground representation, word-of-mouth and social media.

The *Mara Elephant Who's Who and Whereabouts Databases* went online in October 2011 and have been functioning for six months. We report on this first phase of data collection and the basic information that it has revealed about the Mara elephant population.

ElephantVoices is currently supporting the Moi University Masters field research of David Kimutai (KWS MIKE/ETIS officer). David is working in the field to train participants and will be putting special focus on areas of strategic importance. All data uploaded are being monitored, updated and corrected, where necessary, by ElephantVoices via the databases' backend. Joyce Poole and Petter Granli are carrying out this work, assisted by PhD student, Julie Samy, (D.V.M., M.Sc.), Behavior, Ecology, Evolution, and Systematics, and MSc student, Kira Birkhart, Environmental Science and Policy: Biodiversity and Conservation Biology, both at University of Maryland. The online databases and the *Mara EleApp* were conceptualized and designed by ElephantVoices, and programmed by Verviant Consulting Services in Nairobi (http://verviant.com).

Elephant Partners is supported by the Liz Claiborne Art Ortenberg Foundation, Conservation Trust of the National Geographic Society, Fondation Franz Weber, A&K Philanthropy, IFAW, and numerous generous individuals. The success of the initiative depends upon the volunteer participation of many people whose names and affiliations appear online. We are grateful for the broad and enthusiastic support received.

| Who's Who | Whereabouts | Mapping | User Info | Features Guide | Name an Elephant | Join & Support! | Mara EleApp | Acknowledgements | Use of data | Log in/out |

Home • Who's Who

Mara Elephants Who's Who & Whereabouts

| Search for an individual | Query the elephant registry |

| Code | | Family | | -Sex- ⏷ | -Size Class- ⏷ |
| Name | | Matriarch | | Iconic ☐ Translocated ☐ | |

Search **Reset**

Note: See User Info to learn how to use the search function, and click on headings or use Features Guide to understand the terms below.

Home Area	Tusks	Right Ear	Left Ear
Enonkishu Cons	No tusks	Completely smooth	Completely smooth
Kerinkani (GR)	One - left	Smooth with tiny nicks	Smooth with tiny nicks
Kimintet (GR)	One - right	Serrated	Serrated
Koiyiaki (GR)	Three tusks	Ragged	Ragged
Lemek Cons	Broken left	2 or more notches	2 or more notches
Leopard Gorge	Broken right	Unusual notch	Unusual notch

Ear Shape & Lobes	Trunk/Face	Body	Tail
Very big ears	Strange skin pattern	Bump/lump left	Kinky tail
Very small ears	Lip damage	Bump/lump right	Short tail
Wavy edge	Chopped trunk	Permanently lame	Half tail
Lobes curl outward	Slit cut trunk	Collar	No tail
Lobes pointed	Other trunk injury		No tail hairs
Lobes rounded	Wart/bump trunk		

Code	Name	Sex	Age	Age Class	Size Class	Birth Year	BACC	Mother	MACC	Family	FACC	Matriarch
f0001	Big Mama	F	62	5	large adult	1950-01-01	+/- 10 yrs		1	u003	3	Big Mama
f0002	Busara	F	52	5	large adult	1960-01-01	+/- 10 yrs		1	u015	3	

The sightings

Accessing the Mapping function reveals the number of elephant groups observed in the Mara. As of 21 April 2012, 681 elephant group sightings had been uploaded to the Whereabouts Database (Table 1). These "groups" consisted of lone males, bull groups of greater than one individual, and family groups with or without associating males. In addition, eight mortalities were uploaded and have been reported to KWS separately.

Table 1. Number of observations as of 21 April 2012

Group type	Number of observations
Overall	681
Single males	104
Bull groups > 1 individual	76
Family groups with or without associating males	413
Mortalities	8

The participants

As of 21 April 2012, a total of 67 different individuals had contributed data to the online database. Of these 32 had contributed since the beginning of the year (Table 2). Participants included guides, tourists, volunteers, conservancy representatives, Kenya Wildlife Service representatives, veterinarians, and researchers. The system is set up so that people can collect data via the Mara EleApp (freely available for download on the Android Market) and, once registered, they can upload their observations from their smartphone directly to the Mara Elephant Who's Who and Whereabouts Database. Alternative they can enter their observations and photographs online via "My Observations".

Table 2. Number of participants as of 21 April 2012

Number of people participating	Total	Last quarter
	67	32

The Mara elephants Who's Who

As of 21 April 2012 a total of 667 adult elephants had been identified, individually characterized, given an age estimation and been registered on the Mara Elephants Who's Who Database. Of these individuals 442 (66%) were adult females and 225 (34%) were adult males (Table 3).

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 in the Features Guide.

Table 3. Number of elephants individually recognized

Adult elephants individually recognized and registered online	N	%
Total	667	100
Female	442	66
Male	225	34

Estimated size of the Mara elephant population

The June 2010 KWS aerial count estimated the size of the Mara elephant population to be 3000 elephants. These figures, represent a 1000 increase from the 2008 count, which can not be accounted for by natality. It is likely that some of this apparent increase is caused by movement (temporary or otherwise) of elephants into the Mara from areas such as the Mau, Serengeti, Loliondo or the Loita Hills which lie outside the area normally covered by the count.

Indeed, it is possible that the entire population (including the Loita Forest and Loita Hills, but excluding those elephants who reside primarily in Tanzania) may be as high as 3500-4000 individuals. The above total (N=667) represents the number of individual adult elephants thus far registered. Including calves the number accounted for is likely to be around 1,500 elephants. We continue to record new individuals and hope to be able to use "capture recapture" methodology to approximate the total population size.

*Figure 1. Mara elephant population trends (from KWS June 2010 aerial survey report).*
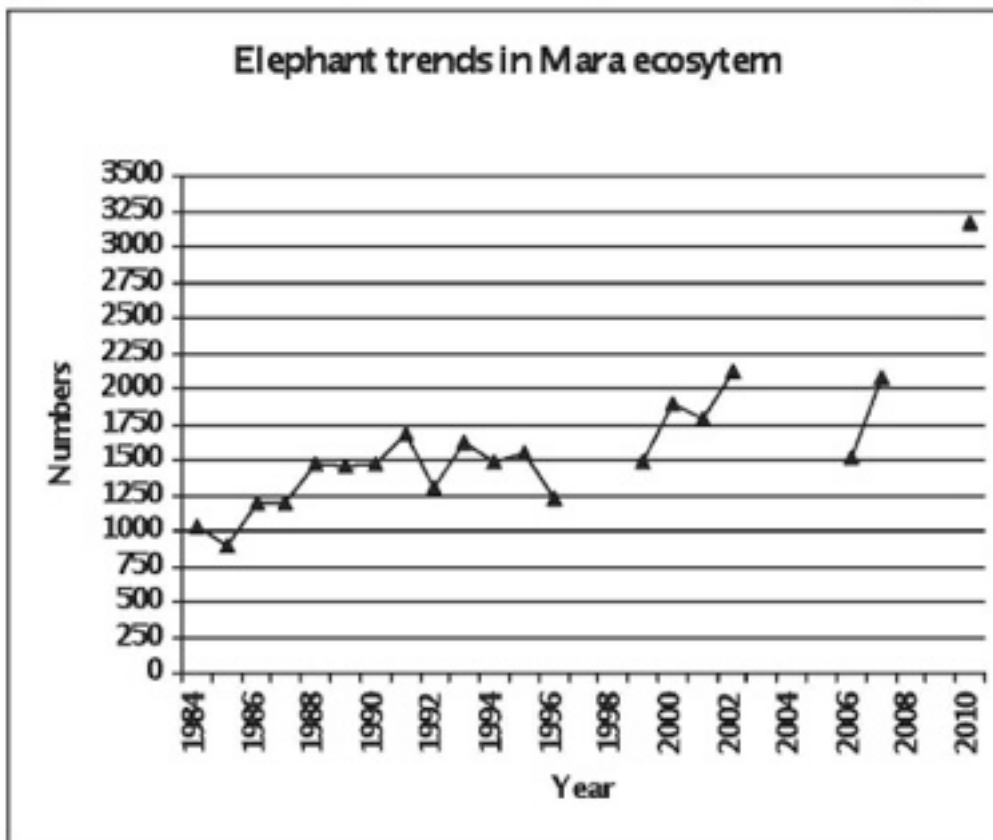
The age structure of adult elephants

As each elephant is registered, Joyce Poole estimates its birth year. The database is coded such that each year the age of every animal is recalculated and automatically entered into the appropriate age class. Following on from the Amboseli study we use age classes as follows: 0A: 0-4.9; 0B: 5-9.9; 1A: 10-14.9; 1B: 15-19.9; 2:20-24.9; 3: 25-34.9; 4: 35-49.9; 5: 50+

The age structure of the currently registered adult elephants is presented in Figure 2. It is immediately clear that the population is skewed toward females. While this is typical of elephant populations (males suffer higher levels of mortality as calves, at independence and as they enter reproductive maturity), the skew is exaggerated in the Mara due to extra pressures on males caused by human-elephant conflict and ivory poaching. Figure 2 reveals that there has been an overestimation of females in the 25-35 year categories and possibly in the 15-20 age group as well. It is likely that some of these individuals belong in the 20-25 age category. Since aging currently mostly is done from photographs such mistakes are not surprising and we will fine-tune the ages as we personally observe these individuals.

Figure 2. Age structure of the adult population
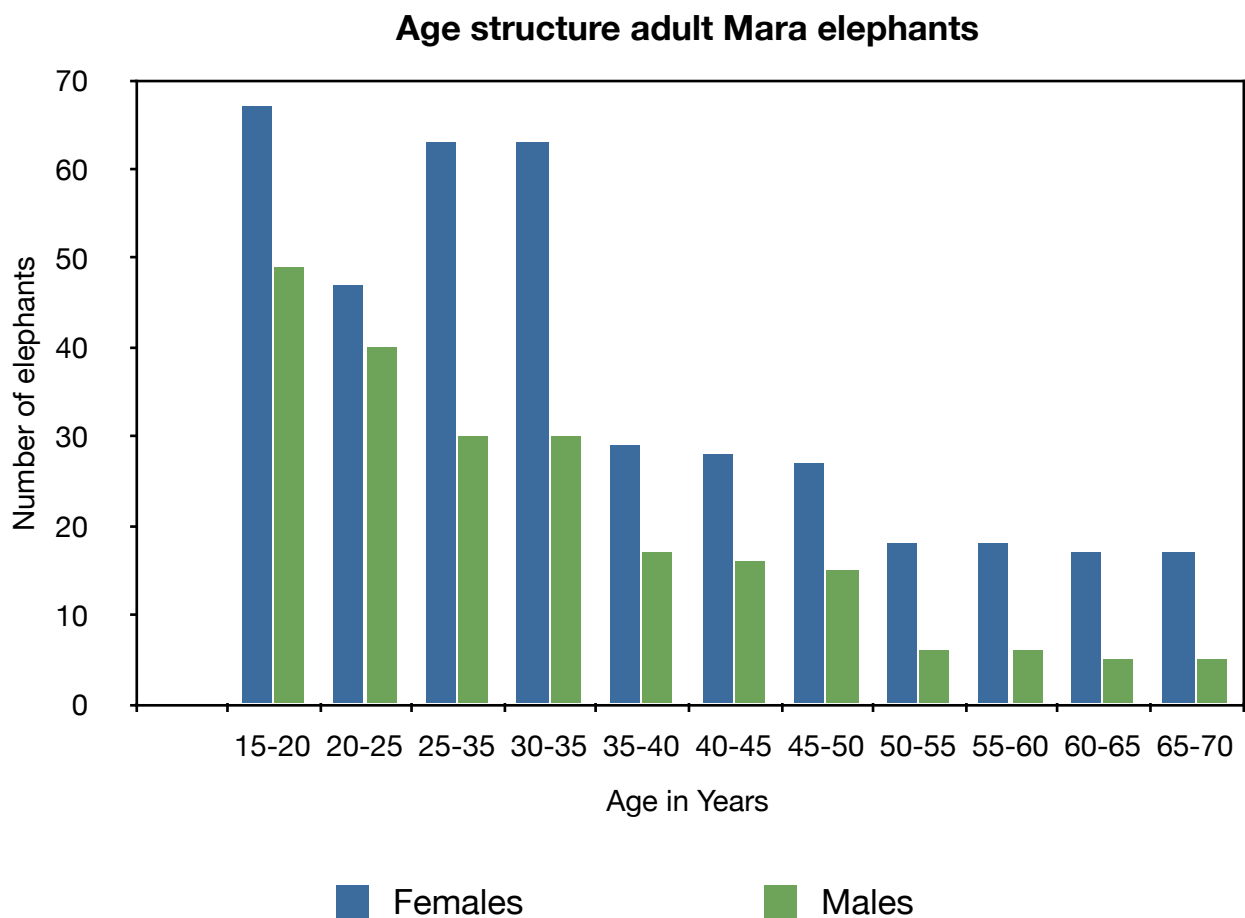
The number and distribution of group sightings

Figure 3 illustrates the number and distribution of elephant group sightings of different types: all group sightings, family groups with or without associating males, lone males and bull groups. The distribution of lone males overlaps with that of family groups, while groups of males appear to have a different distribution. Lone males include both sexually inactive and active individuals. Those who are sexually active are in search of females and their distribution, therefore, overlaps with that of family groups. By contrast, bull groups are typically composed of sexually inactive males. During this phase of their cycle males occupy areas of high biomass in order to bulk up for their next sexually active period. These areas tend to be those with plenty of bush coverage (e.g. Mara Naboisho, Siana, Motorogi) or, in the case of Mara North, areas providing easy access to crops.

Figure 3. Number and distribution of elephant group sightings: all group sightings (bottom left), family groups with or without associating males (top left), lone males (bottom right) and bull groups (top right). The numbers inside the circles indicate the number of groups seen. The colors represent: red tear-drop single observation; blue 2<10 sightings; yellow 10<100 sightings; red 100<1000 sightings. The location of these circles indicate clusters of sightings.
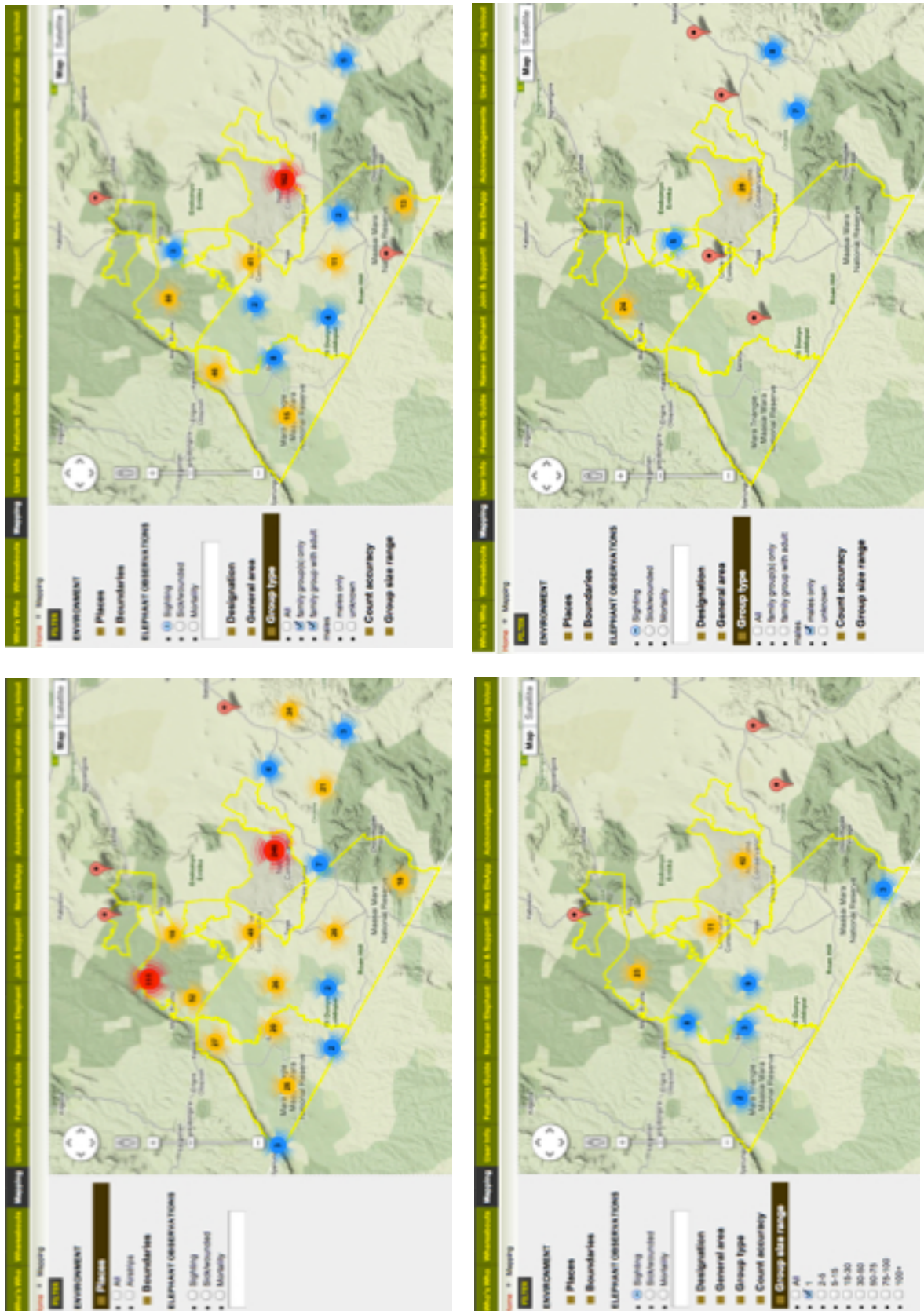
The distribution of large groups

In examining the distribution of family groups (with or without associating males), we noticed that the location of large groups (those greater or equal to 50 individuals) is not evenly distributed across the ecosystem (Table 4). Very few (if any) large groups have so far been recorded in Mara North, Olare Orok, Maasai Mara NR Central (between Sekanani and Musiara) and Mara Conservancy, while a very high percentage of groups observed on Siana and the South Eastern part of the National Reserve are large.

Table 4. Location of large aggregations

Location	Number groups >50	Total number of groups (excluding all-male groups)	% groups >50 individuals
Overall	**24**	**413**	**6%**
Mara North	0	89	0%
Olare Orok	0	28	0%
Maasai Mara NR Central	0	60	0%
Mara Conservancy	1	40	2.5%
Mara Naboisho	11	164	7%
Siana	5	11	45%
Maasai Mara NR SE	7	13	54%

Implications of the data for elephant conservation and management

We would like to highlight some issues revealed by the data that may have implications for the conservation and management of the Mara elephants. We recognize that we are new-comers to the Mara, that the sample is still small and that the data collection introduces some bias. Despite this we believe that the data collected, even at this early stage, provides some valuable indicators. We look forward to future discussions in which the analysis of a broad range of data from different sources will establish a sound basis for the conservation and management of the Mara elephants.

Bulls and bull areas

Early data suggest that adult males primarily visit the National Reserve when they are sexually active and in search of females and that they otherwise depend on the surrounding bushland for foraging and socializing. As we expand the area covered by Elephant Partners we expect to find that bulls are dependent upon habitat that is less well protected than that frequented by the majority of family groups, putting males at special risk. That said males are the pioneers; where males go females often follow. Indeed, the movement of elephants predicts species richness. If we are to ensure the long-term conservation of the Mara's adult males and the population as a whole we must, therefore, find ways to protect the bushland surrounding the national reserve. Some of these areas, such as Mara Naboisho and Motorogi, have recently been made conservancies, but greater conservation efforts - both anti-poaching and habitat protection - are needed if we are to prevent the continuing attrition of males as indicated by the skewed sex ratio and by the male dominated KWS mortality data.

Elephant hub at a crossroads

Mara Naboisho Conservancy was set aside for wildlife conservation in 2010. We know that elephants learn quickly where they are safe and where they are threatened and there are several indications that they now see Mara Naboisho as a "safe-haven". The changing habitat cover, the consistently high number of groups and individuals seen in the area and the documented movement patterns of individual elephants through Naboisho from other areas all indicate that it is "hub" for elephants. It is also likely that if security is not increased in the surrounding areas the pressure on Naboisho's habitat may place it at a crossroads.

Elephant Partners data show that while many families appear to have made Mara Naboisho "home" others pass through the conservancy coming to and from Siana, Olare Orok, Motorogi, Mara Conservancy, Mara North and the National Reserve. Many elephants arrive in Naboisho with fresh and infected arrow wounds suggesting that some of these elephants are coming in from less protected areas such as Ol Donyo Rinka, Maji Moto, the Loita Hills, the Lemek Hills and elsewhere.

To protect habitat and species diversity we must ensure that we protect linkages between landscapes. Land-use planning is going to be critical to the protection of biodiversity of the Mara ecosystem and in mitigating human-elephant conflict.

Large groups, small groups - what can they tell us?

The initial data collected on group size indicates a significant discrepancy in the proportion of large groups between different areas. The tendency for elephants to aggregate can be influenced by social, reproductive, ecological and security factors, and families may aggregate for different reasons in different populations, in different habitats and at different times of the year.

Although the observed differences in our data may be related to sampling error (i.e. the relatively low numbers of sightings recorded in Siana and SE Maasai Mara) this cannot fully account for the sightings observed. It is more likely that ecological differences and/or the level of threat experienced by elephants influences group size in the different areas.

Keith Hellyer of Olderikesi Conservancy has told us that large groups of elephants are a relatively common sight in the south eastern corner of the Mara and on Olderikesi GR. Data gathered thus far bear this out. The elephants in this area cross back and forth from Tanzania and more observations are necessary before we can conclude on the factors affecting group size. The behavior of elephants on Siana, however, suggests to us that they may be in large groups for protection. There has been rather high levels of poaching in and around Siana and the elephants there are particularly agitated by the presence of people, seeking the security of the thick bush when approached.

Although poaching is equally high, if not higher, in the Lemek Hills and surroundings, the heart of Mara North itself is relatively secure. There family groups are surprisingly small. Indeed, a school project carried out by our daughter, Selengei Granli (2011) found that the average family group in Mara North was significantly smaller than elsewhere in the ecosystem. It is possible that the open nature of the habitat and the relatively short grass (often grazed down by livestock) does not facilitate the formation of larger aggregations of elephants.

Elephant Partners - priorities ahead

Very little is known about the movement, occupancy, numbers and group size of elephants from Maji Moto, Siana and Olderikesi Group Ranches eastwards toward the Loita Forest. If the movement of elephants is to remain unobstructed across the South Rift the protection of this area and knowledge of its elephants is crucial. We aim to expand our activities into this region and to discuss with KWS to the possibility of the elephant program carrying out an elephant survey of the Loita Forest. We will continue to recruit and train data contributors both locally and among visitors to the Mara either via tourism entities in the Mara or online.

There is room for further improvements when it comes to the online Google Earth-based mapping function, particularly related to basemaps and basic presentation of data, and this is currently being worked on.

A holistic approach to the elephant conservation of the larger Mara-Serengeti ecosystem is obviously vital - and the Arusha workshop, *Elephants in the Borderlands*, arranged by African Conservation Centre and Liz Claiborne & Art Ortenberg Foundation in mid February 2012 was a major step forward. In the months to come we will contribute ideas toward a data collection and upload system for the elephants in the borderlands.

ElephantVoices, Joyce Poole/Petter Granli, 25 April 2012,
info@elephantvoices.org
www.elephantvoices.org
www.facebook.com/elephantvoices
www.facebook.com/elephantpartners