Collaring Report Amboseli Lion Project

Nairobi, August 2009

Implemented by KWS

SPONSORS:
Van Tienhoven Foundation
Leo Foundation
Kenya Wildlife Service

1. Introduction

This report covers the start of the second phase of the Amboseli Lion Project, including the lion re-collaring in Amboseli NP, Kenya from 15th -22nd August 2009 by a team consisting of Dr. Charles Musyoki (Senior Scientist, KWS), Tuqa Jirmo (Senior Warden, KWS), Paul Udoto (Communications Manager, KWS) Dr. Dominic Mijele (Veterinarian, KWS), Vincent Obanda (Veterinary Research Scientist, KWS), Peter Hongo (GIS Technician, KWS), Monica Chege (Assistant Research Scientitist, KWS, Peter Wamoke (Security Ranger, KWS), Job Sindiyo (Security Ranger, KWS), James Mbogori (Driver, KWS), Felix Micheni (Driver, KWS) Gladys Mutiso (Reporter NationTV), Robert Gichira (Cameraman NationTV) and Peter Hamling (Collaring Consultant). Dr. Hans de Iongh (Chair Van Tienhoven Foundation and Leo Foundation) participated as an observer, with financial support from the Leo Foundation. The collaring operation was co-funded by the Van Tienhoven Foundation and the Leo Foundation.

This lion collaring was implemented as part of the Amboseli lion project, which is implemented by the Kenya Wildlife Service (KWS). During 2007 and 2008 KWS established a collaboration with the Institute of Environmental Sciences of Leiden University and the Leo foundation. KWS has now built the capacity to continue the Amboseli lion monitoring programme under its own responsibility during 2010 and 2011, with follow up support by CML and the Leo Foundation. Lion populations in Kenya are suspected to have decreased considerably over the last two decades, mainly due to habitat loss and conflicts with people and their livestock. Lions from Amboseli National Park regularly kill livestock outside the National Park. The number of lions killed in the Masaai group ranches surrounding Amboseli NP have gradually increased from 21 in 2001 to 44 in 2006 (personal communication, Seamus Maclennan). Since the start of the present project and the consolation scheme in 2007 the number of killed lions went down to one lion per annum during 2007 and 2008. Up till now it is not known whether livestock is habitually killed by the same specific lions, or occasionally killed by several lions. In order to manage lion-livestock conflicts, KWS has initiated the Amboseli lion project.

The project aims at 1) raising awareness among the local people and tourists about lion movements and on how to prevent livestock raiding and at 2) analyzing the movement patterns of lions in the Amboseli ecosystem and provide these data to local communities, KWS staff and the Consolation scheme. Thus, adequate measures can be taken to mitigate the loss of livestock due to lion predation.

2. Background and history of the project

A total number of five lions in Amboseli National Park were fitted during July 2007 with GPS-GSM HAWK collars procured from African Wildlife Tracking of South Africa in order to monitor their movements. The first objective has been successfully met and the results of using the GPS-GSM collars have been beyond expectation and unprecedented, with a success rate of 100%. The movements of all five collared lions have been followed since July 2007. Consequently, adequate measures were taken to mitigate the loss of livestock due to lion predation in order to monitor their movements during the past period.

Amboseli National Park covers 392 km^2, and forms part of the much larger 3,000 km^2 Amboseli ecosystem. The park is surrounded by group ranches owned by local Maasai communities. During the wet season the wild herbivores are dispersed throughout much of the Amboseli ecosystem, but during the dry season the animals concentrate in the park because the park contains permanent springs originating from melt water from the nearby Mt Kilimanjaro. In the dry season Maasai can enter the park with their livestock to get access to water. Consequently, lions are confronted with livestock both inside and outside the park, mixed with their natural prey species. Lions indeed prey on livestock and are killed in retaliation by poisoning, snaring and spearing. Recently several fatalities in two months have been confirmed by the Kenya Wildlife Service (KWS) around Amboseli linked to retaliatory attacks for the deaths of livestock. KWS, responsible for the management of the park, needs information on lion movements in relation to livestock raiding and has requested the assistance of CML in a lion monitoring project.

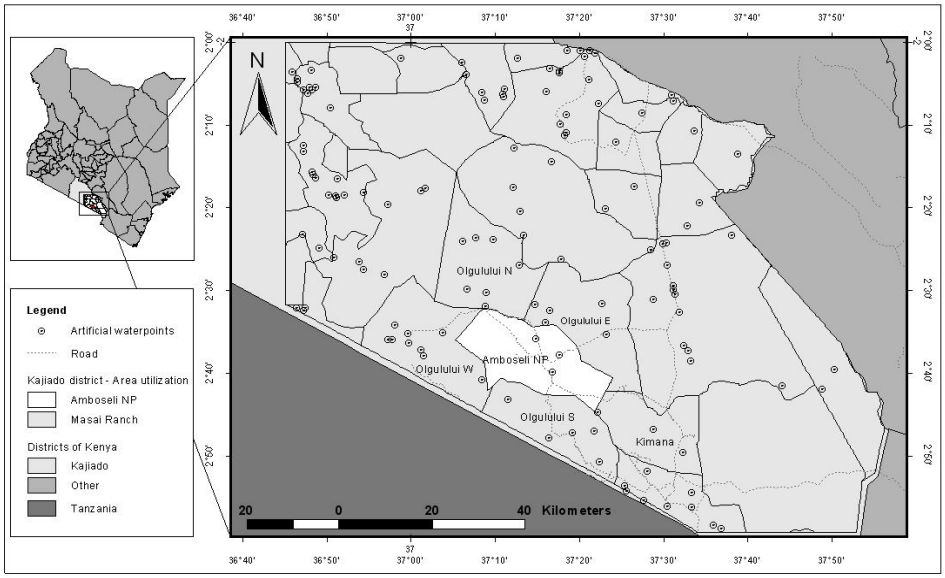

Figure 1. map of Amboseli NP and the surrounding Masaai group ranches

The movement patterns over 2007/2008 (Fig.2) show clearly that the lions have moved seasonally out of the park. Especially during the wet cycle the lions show much more movements outside the park, when lion livestock conflicts are highest.

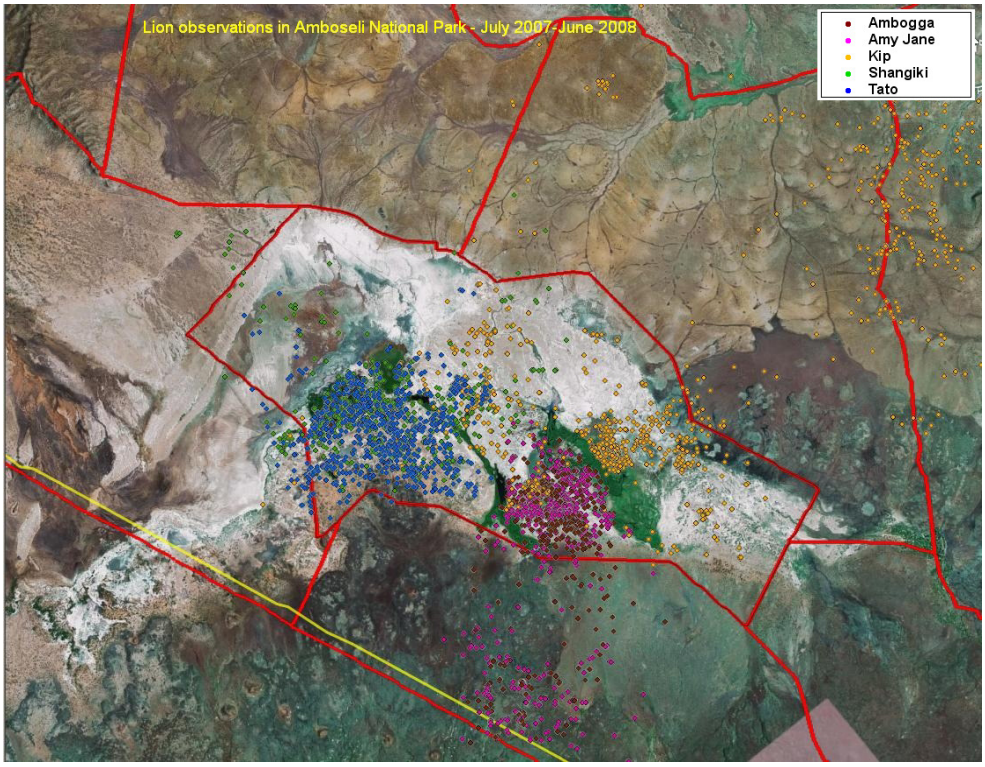

Figure 2. GPS locations of five research lions in Amboseli NP during 2007 and 2008

3. Methods

A total number of five lions in Amboseli National Park have been fitted with GPS-GSM HAWK collars from African Wildlife Tracking SA during July 2007 in order to monitor their movements during July 2007 and 2008. In 2008 three lions were re-collared. The present mission aimed at re-collaring two of the five research lions, whose collars had run out of operation and an additional lion. It also aimed to check the health of the lions and the tightness and condition of the collars

GPS locations are sent through mobile phone units inside the collars by SMS message to a provider who makes the GPS locations available on a website for the researchers involved. The GPS data (representing geographic positions of the lions) have determined their habitat use and possible livestock raiding behaviour over a period of 2 years (from July 2007 to July 2009). The monitoring of the movements of these lions will be followed during another year (August 2009 until July 2011). More specifically, the geographical positioning data are expected to help to generate answers to important conservation questions, such as to what extent lion ranging is affected by human and livestock distribution around the Park and the recent extreme drought. Due to the drought, an increase in lion-livestock conflicts is expected to occur from the end of 2009 and to the beginning 2010, due to decrease in prey densities and increased lion numbers.

A VHF-transmitter system attached to each collar enables direct observations of the lions in the field to investigate pride structure and additional social behaviour.

Interviews with Masaai from the surrounding group ranches confirmed that part of the livestock raiding of lions takes place during herding outside the boma's and part inside and near the boma's. Research of the Laikipia lion project has demonstrated that livestock herds guarded by Moran warriors are less likely to lion attacks than livestock herded by children. Apparently lions have learned to assess the retaliation risk of livestock attacks. Consequently an awareness campaign has been organised by KWS in close collaboration with the Living with Lions project and the Consolation scheme to inform the local Masaai communities and tourists visiting the park about the objectives of the project, the risks of cattle raiding and also about improved methods of herding and protection of livestock.

The accumulated information during the implementation phase of the project will support improvements to management strategies for the Amboseli ecosystem with respect to its lions, and significantly contribute to lion conservation efforts in East Africa.

2. Results of the collaring operation

A total number of five lions in Amboseli National Park were fitted with GPS-GSM HAWK collars during July 2007 in order to monitor their movements The collared lions consisted of two males and three females from at least two prides in the park. In 2008 three of these lions were re-collared (two males and one female). During the current mission two lions were re-collared (one male and one female) and one new lioness was collared. Details of the collaring are summarised in Table 1 below and in the annexes.

Table 1. Synopsis of lions collared during July 2007 to August 2009 in Amboseli NP (red column shows present collaring)

Lion	L1 ("Amy Jane") Old	L1 ("Amy Jane") old	L3 ("Kip") old	L3 ("Kip") old	L3 ("Kip") New	L5 ("Ambogga") old	L5 ("Ambogga") new
Date of collaring	9 July .2007	12 July .2008	11 July 2007	101July 2008	17 August 2009	12 July 2007	13 July 2008
Internet code	AS 69	AS 71 (former collar of Kip)	AS 71	AS 129	AG 174	AS 73	AS 128
VHF-frequency	149.820 MHz	149.7067 MHz	149.7067 MHz	149.7067 MHz	149.390 MHz	149.9509	149.2100
Sex	Female	Female	Male	Male	Male	Male	Male
Age	6 years	7 years	3-4 years	4-5 years	5-6 years	3-4 years	4-5 years
Health status	Very good	Very good	Good	Good	Excellent	Very good	Very good
Observations during collaring	Observed in a group of 10	Observed in a group of 5	Observed with 1 lioness	Nomad, with mate	Became pride male of pride with at least 3 females and 6 cubs	Observed in a group of 10	Observed in a group of 4

Table 2. Synopsis of lions collared I during July 2007 until august 2009 in Amboseli NP (red column shows present collaring)

Lion	L2 ("Tato")	L2 ("Tato")	L4 ("Shangiki")	L6 (Willy)

	old	New	old	new
Date of collaring	10 July 2007	19 August 2009	11 July 2007	17 August 2009
Internet code	AS 70	AS 129(former collar of Kip)	AS 72	AG 175
VHF-frequency	149.860 MHz	149.067 MHz	149.7289 MHz	149.620 MHz
Sex	Female	Female	Female	Female
Age	8-9 years	10-11 years	4-5 years	4-5 years
Health status	Average	Excellent	Very good	Excellent
Observations during collaring	Observed alone with 1 cup	Observed in pride with one other female (Willy), one pride male and four cubs. Nose darker	Observed alone. She has a very pink nose	Observed with 3 sub aduts, probably member of Shangiki's pride

A chronological overview of the collaring operation is summarised below.

Saturday 15 August
Meeting with Charles Musyoki and Tuqa Jirmo, update on latest planning arrangements.

Sunday 16 August Travel from Nairobi to Amboseli NP, KWS HQ.
Meeting with team members. Preparation for the collaring operation

Monday17August
At 6.00 a.m. the team leaves camp for Ol Tukai swamp. When arriving a radio signal of Kip is received and by homing in the team enters the swamp. At about 7.15 a.m. Amy Jane and a second lioness is observed with six cubs of about 3-4 months old. Two fresh carcasses of wildebeest are found in the surrounding area.

Five minutes later Kip is observed, mating with a third female. Kip looks battered in the facial region and shows multiple wounds from a recent fight. It seems that he has succeeded finally in a pride take over. A decision is made to try a darting operation and the vet prepares a dart. At around 8.00 a.m. a darting attempt is made, but Kip and his female show high excitement at the approaching of the vets car and enter the dense shrub.

Kip courting with pride female

The team decides to postpone the collaring and returns 11.00 a.m. Kip is found in the same shrub were it was hiding when the team left and when he leaves the shrub he is darted at 11.15. Kip moves to a fresh wildebeest carcass and goes down at 11.30 a.m. During re-collaring the wounds are treated and Kip health is checked by the vet and measurements are made (Annex 1). The lion seems to be in good condition, in spite of the wounds from a recent fight. Re-collaring is finished at 12.00 hours and the anti dote is administered at 12.15. At 13.00 Kip is fully recovered and the team leaves the site.

Kip darted near fresh wildebeest carcass.

In the afternoon the team leaves at 16.00 p.m. and travels along Ol Tukai swamp, where no radio signals are received of neither Kip nor Amy Jane. At 18.30 the team reaches a location in the Sinet delta at 2,6367 S and 37,18027 E and decides to prepare a baited calling station (leg from wildebeest). At 18.45 p.m. the calling station starts (buffalo calf) and at 19.30 a female is observed at approximately 200 m from the bait. The lioness is darted at 19.45 in the dark and collaring starts at 20.00. The team succeeds to attach the collar, but due to a low dose the lioness awakes prematurely and the measurements have to be aborted. No data can be obtained on measurements of the lioness. The lioness called “Willy” is observed two days later in good health.

Lioness "Willy"with newly fitted collar

Tuesday 18 August

The team leaves camp at 6.00 a.m. and moves to Tortillus lodge. Radio tracking is done for Ambogga along the road, but no signals are received.

At 8.30 a.m. the team arrives a Tortillus lodge and meets with the manager Mr John. Dr Musyoki explains the objectives of the project and provides a poster to the manager for display to tourists. The team leaves Tortillus around 10.00 a.m. and moves to Serena lodge, where also a meeting is held with the manager Mr. Herman Mwasaghua to explain the objectives of the project and to provide a poster to give information to tourists.

Dr Charles Musyoki showing the poster to Serena lodge manager Herman Mwasaghua

In the afternoon the team leaves at 16.00 hours again for the Sinet delta. A new calling station (buffalo call, pig squeal and lion roar) is prepared at 2,62922 S and 37,15581 E. At 19.00 p.m. the calling station starts and at 20.00 p.m. it is terminated without success, the team returns to camp.
Wednesday 19 August

A small team leaves at 5.00 a.m. for the Sinet delta to make a scouting mission. At 7.45 a.m. the team arrives in the Sinet delta and picks up the radio signal of "Willy". The team homes in and finds "Willy"together with two cubs of approximately 8 months and Tato with two cubs of approximately 15 months. According to a local tourist guide of Tortillus lodge, a pride male is nearby, but the team does not succeed to observe it. The rest of the team is called in by mobile telephone and at 11.15 a.m. Shangiki is darted. Collaring starts at 11.45 a.m. and finishes at 12.45 p.m. All measurements are taken and the lioness seems in prime condition (Appendix 2).

Thursday 20 August

This day is reserved for carcass counts (morning) and assisting the vet by the treatment of two elephants, which had been injured by poachers (one with an arrow wound and another with a snare in the hind leg). Three teams count a total of 386 carcasses during the morning, which shows the severe impact of the draught.

Fresh emaciated carcass of a wildebeest, which died of a combination of the draught and secondary tick desease

Friday 20 August

At 6.00 a.m. a small team leaves camp to check for Ambogga. At 6.30 a.m. Ambogga is observed together with a coalition partner walking towards Ol Kenya swamp. Amboga and his mate seem in good condition.

Ambogga moving into Ol Kenya swamp on 20 August

3. Suggestions for further research

In addition to the awareness campaign, which has been implemented with support from WWF Netherlands, the spatial analyses of lion movements based on anticipated GPS data, and lion field data collection could focus on the following issues:

- Lion social organisation (group size, pride composition)
- Interactions with hyenas (esp. mutual scavenging)
- Prey abundance and distribution (park and surrounds)
- Livestock abundance and distribution (surrounds)
- Prey preference (i.a. carcass counts)
- Circadian movement patters of lion and prey (incl. hypothesis of prey moving to vicinity of masaai bomas for protection at night)
- All parameters linked to livestock depredation (incl. forensics and assessment of livestock keeping practices after incidents)

4. Meetings with other projects

During our stay we met the Manager of several Tourist lodges, amongs others manager Mr. Herman Mwasaghua of Serena Lodge, Mr. Ken Mungai of Ol Tukai Lodge and John Peacock of Tortillis lodge and we informed them about the background of the project. In addition we distributed posters among the lodges to inform them about the background of the project and request their collaboration in providing observations on collared lions in the Park. We also met with Soila Sayalel Treasurer of the Amboseli Predator Consolation scheme and coordinator of the Amboseli Elephant Research project The consolation scheme has been quite successful in bringing down the number of lion killings in that particular group ranch and it needs a follow up in other Masaai group ranches. We agreed to collaborate on this aspect in the Masaai group ranches adjacent to Amboseli NP.

4. Acknowledgements

This collaring operation has been funded by Van Tienhoven Foundation and the Leo Foundation, executed by KWS. The team is greatful for this financial assistance. In addition the team wants to express its gratitude to the Senior Warden and staff of Amboseli National Park for their full support to the collaring operation.

Many thanks also go to African Wildlife Tracking for timely delivery of the collars, the two KWS rangers who provided security during the exercise and to the Amboseli lions that rendered themselves the team.

ANNEX 1

DATA SHEET LION COLLARING

Name data recorder: Monica Chege Date: 17/8/09

Time 1st obs:	7.47	Time darting	11.15
Time 1st signs immob	11.20	Time collaring start	~~12.30~~
Time collaring finish	12.00	Time Antidote	12.15
Time 1st signs recov	12.25	Time getting up	12.30
Time team left	13.00		

Remarks

Location: GPS: 2.679750, 37.2629E Description:

Habitat: Ol Tukai Swamp

Cubs: total number: 6; number of males: ___ number of females: ___

Other lions: total number: 3; number of males: 3 number of females: ___

Parameter	Measurements	Remarks
Name lion		KLP
Sex	M / F	
Age	5-6 yrs	
Health status *	5	
Nose-tail length	269 cm	
Shoulder height	89 cm	
Weight	89? kg	
Collar circ	82 cm	
Frequency receiver	149.390 MHz	
Upper canine width	7 cm	
Lower canine width	6.8 cm	
Paw front left	Length 13 Width 8	
Paw front right	Length 14 Width 9	
Paw hind left	Length 9/12 Width 8	
Paw hind right	Length 12 Width 8	

**Health status: 1= very poor; ribs visible, 2 = poor, 3= average, 4 = good, 5 = very good; fat*

length left upper canine 4.7
length right lower " 3.8

ANNEX 2

DATA SHEET LION COLLARING

Name data recorder: Monica Chege Date: 19/8/09

Time 1st obs: 11.00 h Time darting 11.15

Time 1st signs immob 11.40 Time collaring start 12.00 u.

Time collaring finish 12.45 Time Antidote 12.45

Time 1st signs recov 12.55 Time getting up 13.05

Time team left 13.15 h.

Remarks 02.63217 37.1660

Location: GPS: ____ Description: ____ 2 ± 1)

Habitat: ____ 2 ± 1.5

Cubs: total number: 4; number of males: ___ number of females: ___

Other lions: total number: 2; number of males: ___ number of females: 2

Parameter	Measurements	Remarks
Name lion	Tato	
Sex	M / F	
Age	yrs	
Health status *		
Nose-tail length	246 cm	
Shoulder height	98 cm	
Weight	kg	
Collar circ	cm	
Frequency receiver	MHz	
Upper canine width	68 ~~cm~~ mm	
Lower canine width	cm	
Paw front left	Length 120 mm Width 78 mm	
Paw front right	Length 110 mm Width 70 mm	
Paw hind left	Length 110 mm Width 63 mm	
Paw hind right	Length 95 mm Width 65 mm	

**Health status: 1= very poor; ribs visible, 2 = poor, 3= average, 4 = good, 5 = very good; fat*

right upper canine 45 mm

left upper " 45 mm

lower canine ~~8~~ 80 mm

missing left lower canine

ANNEX 3

Above left Tato July 2007 and above right lioness collared in August 2009

Below left Shangiki July 2007 and below right lioness collared in August 2009