

**Lion Collaring Operation in Waza national park, Far North
Province, Cameroon, May 5 – May 10, 2007.**



**This operation was conducted as a joint effort by
Centre d'Etude d'Environnement et du Developpement au Cameroun (CEDC),
Institute of Environmental Sciences, The Netherlands (CML)
with the support of Paul Funston, Tshwane University of Technology (TUT),
Pretoria, South Africa as consultant,
and in close collaboration with MINFOF, MINEP & MINESUP Cameroon,
within the framework of a PhD research on lions by Pricelia T. Fobuzie in Waza
NP, Cameroon.**

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INTRODUCTION

The lion is one of those wildlife species that human population growth and activities have caused a decline in their populations as well as a reduction of their geographic ranges all over the world (Woodroffe, 2000). Lions were probably the most widespread terrestrial mammals, ranging from Southern Africa to Northern Europe and across all Asia (Nowell & Jackson, 1996; Turner & Anton, 1997; Kingdon, 2003). Today lions are restricted only to Sub-Saharan Africa and a small endemic population of the Asiatic lion in India (Schaller, 1972). In these ranges which are greatly fragmented, protected areas and their immediate surroundings are becoming the only refuge for the lion.

The lion is a symbol of power in Africa and has great traditional as well as cultural and tourist values throughout its range. Ecologically, it is a flagship species and its presence in an area is an indicator of its wild and natural integrity (IUCN/SSC, 2006). Lions are a major tourist attraction in national parks. Tchamba (1996) reported that 22% of tourists who visited the Waza national park did so to see lions. In Eastern and Southern Africa, virtually all visitors travel there to see the big five (the five great species of trophy hunting in Africa), with the lion topping the list. Even though the lion has the above advantages and benefits, it is a problem animal commonly into conflict with man over livestock. Lions need a lot of space for survival and pay no attention to park boundaries. Outside protected domains they are a nuisance to farmers and are seriously persecuted in retaliation.

The lion is classified as Vulnerable by IUCN SSC Cat Specialist Group in the IUCN Red list of Threatened species. At the level of West and Central Africa based on recent estimates and threats, the lion qualifies as an Endangered species. Experts recently estimate 16,500 –30,000 African lions remaining, 10% of the number alive some 25 years ago (Bauer & van der Merve, 2004). According to the same source, there are about 1,800 individual lions in West and Central Africa, with 260 individuals in Cameroon. The remaining estimate in Cameroon is fragmented within the sudano-sahelian ecosystem in the North and Far North provinces, in four national parks including hunting zones. One can basically note two populations of about 60 lions in Waza national park and 200-300 in the Benoue complex (Bauer *et al.*, 2001; Schultz & Turks, 2002; Schoe, 2007). The lion density in Waza estimated at 3.5 lions/100km² (Bauer & van der Merve, 2004) and recently at 2.9 lions/100km² (de Iongh *et al.*, 2005) is low when compared to South African parks, but higher compared to West and other Central African countries. The lion's habitat and number in Cameroon are reported to be declining subject to various threats (Bauer, 2003b). In Cameroon, the main threats are not different from the regional threats: loss, fragmentation and degradation of the habitat; the reduction of the natural prey base; the human-lion conflict and insufficient institutional capacity at the level of management of the conservation areas harbouring the lions.

The Waza national park not having a buffer zone is under serious pressure from the riverine populations. They exploit the adjoining pasture and very often encroach directly into the park; with serious repercussions on the park's vegetation and subsequently its fauna (Saleh, per. Comm.). The cultivation of millet during all seasons practiced in this area leads to the permanent quest of new land and is the main

reason for the loss of habitat. Also, the repeated droughts that raged in this northern part of the Country coupled with the process of desertification have affected the habitat. This area also plays a key role in the yearly migration of many pastoralists, due to the availability of nutritious grass regrowth and surface water far into the dry season, when the surrounding grassland are all dried up. This situation provides all conditions for conflicts with lions over space and resources. As reported by Bauer (2003), the Waza lions generally live in small groups of 1-2 animals that occupy large home ranges (mean home range 630km²). Livestock depredation and lion damage to cattle is considerable around this park (Bauer and Kari, 2001; Bauer, 2003).

Considering the status of the lion in this region and the fact that the factors responsible for its decline are still at play, continuous monitoring of lion ecology in relation to anthropological factors remains vital. As suggested by Woodroffe and Ginsberg (1998), conflict with people on reserve borders is the major cause of mortality in lion populations. Studies in East Africa have shown that proprietors that lose fewer livestock to predators tend to kill fewer predators. Thus predators can be conserved successfully if they are prevented from taking stock (ref). Every livestock producer has their own opinion on which practices best protect stock. This PhD study intends to add data on the existing literature on Waza lions and to investigate which of the management techniques currently used by livestock owners are most effective. To better monitor the lions, a collaring operation was conducted in Waza national park between May 5 – May 10, 2007. Four lions were successfully collared with GPS-PLUS collars. The GPS data will determine their habitat use and ranging behaviour over a period of 2-3 years. This will reveal to what extent lion ranging is affected by human and livestock distribution. A VHF-transmitter system attached to each collar will enable direct observations of the lions in the field to study group and pride size as well as their behaviour. Data from this study will contribute to lion conservation efforts in the Waza NP and in the West and Central African region.

RESEARCH AREA

The Waza National park covers a surface area of approximately 1 700 km² and lies between latitudes 10°50' and 11°40' and longitudes 14°20' and 15°00'. Climate is Sudano-Sahelian, semi-tropical, with a mean annual rainfall of 650 mm (Beauvillain, 1995). Temperatures range from 15° C (January mean minimum) to 48° C (April mean maximum). The vegetation of Waza national is divided into three categories: floodplain vegetation in the Eastern half dominated by heavy cracking clay soils (vertisols), acacia vegetation lying between the floodplain and the woodland is also a zone with clay soils and the woodland zone found west of the park is on sandy soils. (Wit, 1975; Scholte et al., 2000). The Waza national park has an important animal diversity, especially a rich avifauna with 379 species including ostrich (*Struthio camelus*) and crowned crane (*Balearica pavonina*) (Scholte et al., 1999) and at least 30 species of mammals. The main production systems around the Waza NP are fisheries, animal husbandry and agriculture. Among pastoralists, the largest ethnic

groups are the Fulbé followed by the Choa Arab. The Arab pastoralists that use the floodplain are nomadic while the Fulbé can also be divided into nomadic and agro-pastoralists. Other ethnic groups in the floodplain are the Kotoko mainly involved in fisheries, and the Mousgoum involved in agriculture and small scale animal husbandry. As mentioned earlier this park is hard edged with no transition zone, surrounded by 19 villages.

COLLARING OPERATION

Preparations

Preparation for the lion collaring operation started mid 2006 with arrangements for purchasing four collars and obtaining the required permits. Importation permit, a CITES permit, tagging permit and a permit to shoot five Buffon's kob to be used as bait; and research permits for all the participants were obtained from the relevant authorities in time for the operation. A preliminary survey to determine best locations with highest lion presence was conducted from March to end of April 2007. Information from all lion sightings by tourist was also requested during this period.

Participants

The lion collaring team was composed of the following participants:

- Hans de Iongh (Program Director, CML)
- Paul Funston (Consultant/ Lecturer, Tshwane University of Technology)
- Ralph Buij (Counterpart Coordinator, CEDC)
- Barbara Croes (Executive Research, CEDC)
- Nobert (Veterinarian, SNV)
- Pricelia T. Fobuzie (Principal Investigator/Lecturer, CML/CEDC/University of Dschang)
- Saleh Adam (Conservator, Waza NP)
- Tim van Berkel (Student, CML)
- Tania Patricia (Student, CML)
- Nadia (Student, University of Dschang)
- Pierre II Batoukini (Student, University of Dschang)
- Yaya Moumini (Student, University of Dschang)
- Armed guards (3)
- Drivers (3)

Methods

Four GPS-PLUS collars with a VHF transmitter system purchased from Vectronic Aerospace were used for collaring. These collars are supplied with a Handheld Terminal that communicates with the collars and with the GPS-PLUS Software. As mentioned earlier a preliminary survey of the area was conducted and the calling station site selection was based on lion encounter probability. Most attention was in

the floodplain section of the park where both the prey and predators concentrate during this period of the year.

Calling stations are used for the collaring operation. Lions were attracted within darting distance using a calling station set-up as described by Ogotu and Dublin (1998). Calls were played 30-45 minutes alternated by 15 minutes of silence until lions showed up or for 90min after which the team moved to the next location. An MP-3 player connected to a 400 Watt amplifier and two speakers (50 Watt each) placed on the roof the car supplied the sound playback. This car was positioned at 23m from a dead Buffon's kob attached firmly to the base of a tree. Before attaching the bait to a tree, it was peeled on one side, dragged from behind a vehicle for 1km in different directions before the start of a calling station. The vehicle from which darting was done, was positioned at 20m to the tree with the bait and parked parallel to the other vehicle. Darting was accomplished from a Dan-inject immobilization gun with a 1.5 ml dart containing Zoletil 100.

The combination of bait, a scent- drag and playback of buffalo calf or warthog distress calls optimizes the chance of attracting lions to a calling station but does not however guarantee success. Bait was used to minimize the flight behaviour when a torch was flashed on them and to maximize the time a lion stayed at a calling station (Funston, pers. Comm.). When a lion appeared at bait, it was gradually habituated to a spotlight before darting. The team only approached an immobilized lion on instructions by Dr Funston and measurements only started if the health status of the lion was judged to be good. After measurements, collection of samples and collaring, the lions were monitored during recovery. The team only left when they were sufficiently recovered.

RESULTS

A total of eleven capture sites among which eight calling stations with bait were set-up. This led to the collaring of four lions: two males and two females from the 5th to the 10th of May 2007.

The team arrived Waza at 1.00pm on the 5th of May 2007. Park trackers had been sent ahead in the morning to prepare capture site and to kill a kob for bait. The team got to the site at 4.00pm, the trackers had not secured bait so they were sent out to get one. In the process of obtaining the bait, they encountered a group of seven lions and reported to the team. The team leader decided we should home-in on this group after the darting expert declared it was possible to home-in and dart the lions. An adult female lion was darted first, followed by the lone adult male of the group. When the lions appeared fully sedated, Paul Funston approached them for a preliminary inspection and signalled the other vehicles to approach. The female was transported on the back of a pick-up close to the male. Measurements, collection of samples and collaring were initiated after the team expert declared the health status of both lions good. The following are data of the two lions:

First darted lion

| | |
|-----------------------|-----------------------------------|
| Capture site | Gobe |
| GPS location | N : 11° 32'28.6" ; E 14° 83'72.7' |
| Total number of lions | 7 |
| No. of males | 1 |
| No. of females | 2 |
| No. of cubs | 4 |
| Start calling station | Not applicable |
| Time of darting | 17: 48 h |
| Sex of darted lion | Female |
| Lion name | Elizabeth |
| Collar code | 03594 |
| Body weight | 103 kg |
| Time team left | 20: 45 h |
| | |

Second darted lion

| | |
|-----------------------|-----------------------------------|
| Capture site | Gobe |
| GPS location | N : 11° 32'28.6" ; E 14° 83'72.7' |
| Total number of lions | 7 |
| No. of males | 1 |
| No. of females | 2 |
| No. of cubs | 4 |
| Start calling station | Not applicable |
| Time of darting | 17: 56 h |
| Sex of darted lion | Male |
| Lion name | Jean - Pierre |
| Collar code | 03591 |
| Body weight | 186 kg |
| Time team left | 20: 45 h |
| | |

When the team left Gobe (the first capture site), a calling station was set-up (to be continued)

DATA SHEET LION COLLARING AND MORPHOMETRICS

Date of Collaring ____ 05-05-07 ____

Time of 1st obs: _17:30____

Time darting __17:48____

Time 1st sign immob ____17:53____

Time collaring start __18:15____

Time collaring finish __19:20____

Time Team left __20:45____

Location _Gobe____ GPS ____N : 11° 32'28.6" ; E 14° 83'72.7"____

Habitat ____Flood plain____

Total number of lions __7__ Male __1__ Female __2__ Cubs __4__

| Parameter | Measurements | Remarks |
|--------------------|--|-----------|
| Name lion | Elizabeth | |
| Code | 03594 | |
| Frequency receiver | | |
| Sex | Female | |
| Age | 9-10 yrs | Old adult |
| Health status* | Good | |
| Nose- tail length | 2m 37cm | |
| Shoulder height | 81cm | |
| Weight | 103kg | |
| Neck circ | 29.1cm | |
| Chest circ | 97.8cm | |
| Canine length | Upper left:4.2cm;Upper right:2.3cm Lower left: broken; Lower right:3.1cm (partly broken) | |
| Paw front left | Pad width:7.4cm; Pad length:5.0 cm Total length: 9.9 cm | |
| Paw front right | Pad width:7.3cm; Pad length:5.3cm Total length: 11cm | |
| Paw hind left | Pad width:6.7cm; Pad length: 4.8cm Total length:10.6cm | |
| Paw hind right | Pad width:6.4cm; Pad length:5.7cm Total length:9.9cm | |

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

DATA SHEET LION COLLARING AND MORPHOMETRICS

Date of collaring 05-05-07

Time of 1st obs: 17:30

Time darting 17:56

Time 1st sign immob 18:01

Time collaring start 18:15

Time collaring finish 19:20

Time Team left 20:45

Location Gobe GPS N : 11° 32'28.6" ; E 14° 83'72.7"

Habitat Floodplain

Total number of lions 7 Male 1 Female 2 Cubs 4

| Parameter | Measurements | Remarks |
|--------------------|--|-------------|
| Name lion | Jean-Pierre | |
| Code | 03591 | |
| Frequency receiver | | |
| Sex | Male | |
| Age | 8yrs | Prime adult |
| Health status* | Very good | |
| Nose- tail length | 2m 80cm | |
| Shoulder height | 1m 13cm | |
| Weight | 186kg | |
| Neck circ | 51.8cm | |
| Chest circ | 1m 26cm | |
| Canine length | Upper left:4.9cm;Upper right:5.1cm Lower left:4.1cm; Lower right:4.1cm | |
| Paw front left | Pad width:8.5cm; Pad length:7.0cm Total length:12.3cm | |
| Paw front right | Pad width:8.5cm; Pad length:6.9cm Total length: 12.8cm | |
| Paw hind left | Pad width:7.9cm; Pad length:6.2cm Total length:12.5cm | |
| Paw hind right | Pad width:8.4cm; Pad length:6.1cm Total length:11.7cm | |

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

DATA SHEET LION AND MORPHOMETRICS

Date of Collaring 06-05-07

Time of 1st obs: 17:58

Time darting 18:27

Time 1st sign immob 18:33

Time collaring start 18:50

Time collaring finish 19:20

Time Team left 19:40

Location Ganzamia GPS N : 11°28'04.2" ; E : 14°80'82.9"

Habitat Floodplain

Total number of lions 1 Male 0 Female 1 Cubs 0

| Parameter | Measurements | Remarks |
|--------------------|---|---------|
| Name lion | Fanne | |
| Code | 03593 | |
| Frequency receiver | | |
| Sex | Female | |
| Age | 5-6yrs | |
| Health status* | Very good | |
| Nose- tail length | 2m 40m | |
| Shoulder height | 80cm | |
| Weight | 110kg | |
| Neck circ | 57cm | |
| Chest circ | 97cm | |
| Canine length | Upper left: 4.3cm; Upper right:4.2cm Lower left:3.1cm; Lower right:3.1cm | |
| Paw front left | Pad width:7.0cm; Pad length:5.4cm Total length:9.8cm | |
| Paw front right | Pad width:7.5cm; Pad length:5.2cm Total length:9.2cm | |
| Paw hind left | Pad width:6.3cm; Pad length:5.6cm Total length: 10.7cm | |
| Paw hind right | Pad width:6.1cm; Pad length:5.4cm Total length:10.3cm | |

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

DATA SHEET LION COLLARING AND MORPHOMETRICS

Date of Collaring 10-05-07

Time of 1st obs: 05:30

Time darting 07:04

Time 1st sign immob 07:18

Time collaring start 07:30

Time collaring finish 08:02

Time Team left 08:30

Location Louloubaya GPS N : 11°33'91.6" ; E : 14°58'08.8"

Total number of lions 4 Male 3 Female 1 Cubs 0

| Parameter | Measurements | Remarks |
|--------------------|--|---------|
| Name lion | Adam | |
| Code | 03590 | |
| Frequency receiver | | |
| Sex | Male | |
| Age | 5yrs | |
| Health status* | Very good | |
| Nose- tail length | 2m 87cm | |
| Shoulder height | 1m 8cm | |
| Weight | 160 . ⁺ 5 kg | |
| Neck circ | 64cm | |
| Chest circ | 1m 12cm | |
| Canine length | Upper left:5.1cm;Upper right:5.3cm Lower left:4.0cm;Lower right:4.0cm | |
| Paw front left | Pad width:8.3cm; Pad length:6.8cm Total length:10.9cm | |
| Paw front right | Pad width: 7.9cm; Pad length:6.2cm Total length:12.3cm | |
| Paw hind left | Pad width:8.0cm; Pad length:6.8cm Total length:11.4cm | |
| Paw hind right | Pad width:7.8cm; Pad length:6.6cm Total length:12.1cm | |

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