

Kenya Wildlife Service



Immobilization and Translocation Protocol for the Giraffe (*Giraffa camelopardalis*) in Kenya

Veterinary Services Department
Division of Biodiversity, Research & Planning
Kenya Wildlife Service
P. O. Box 40241-00100
Nairobi, Kenya
Telephone: +254 (20) 6000800 or 6002345
Mobile: +254 726610508/9 or 736663421
Fax: +254 (20) 6003792
Website: www.kws.go.ke
Email: vet@kws.go.ke , research@kws.go.ke

June, 2019

DOCUMENT CONTROL


Document Title	Immobilization and Translocation Protocol for the Giraffe (<i>Giraffa Camelopardalis</i>) in Kenya (2018)
Identification No.	KWS/VET/BRP/005/2018
Issue No.	1
Revision No.	1
Date of Issue	October 2018
Office of Origin	Veterinary Services Division
Approving Authority	Director General
Signature	
Distribution List	<ol style="list-style-type: none">1) Director, Biodiversity Research and Planning2) Director, Parks and Reserves3) Head, Veterinary and Capture Services4) Head, Species Conservation and Management5) In-charge, Capture and Translocation6) All Heads of Departments, Biodiversity Research and Planning7) Management Representative

TABLE OF CONTENTS

1.	Introduction	4
2.	Giraffe Subspecies Found in Kenya.....	4
3.	Capture Challenges due to Giraffe’s Unique Anatomy and Physiology.....	4
4.	Planning for Immobilisation and Capture.....	5
5.	Immobilisation Drugs and Darting Techniques.....	6
6.	Recovery, Boma Holding and Transportation.....	8
7.	References	9

1. Introduction

This protocol has been developed to guide the immobilisation and translocation of the giraffe (*Giraffa camelopardalis*) in Kenya. It is intended to ensure that interventions in giraffes are carried out using 'best practices' by giving recommendations on the practical aspects. It is to be implemented in the context of prevailing Kenyan laws and policies pertaining to biodiversity conservation and sustainable management of natural resources and veterinary practice including the Wildlife Conservation and Management Act of 2013, Veterinary Surgeons and Veterinary Para-professional Act 2011, Prevention to Cruelty Act Cap 360, the Veterinary Surgeons and Veterinary Para-Professionals Regulations of 2013 and the Veterinary Surgeons and Veterinary Paraprofessionals (Code of Ethics) Regulations of 2015. If the immobilisation is for purposes of translocation, the recommendations in the Guidelines for Translocation of Wildlife Species in Kenya (2018) shall apply.

2. Giraffe Subspecies Found in Kenya

According to the IUCN Giraffe and Okapi Specialist Group, there is one species of giraffe (i.e. *Giraffa camelopardalis*) and 9 subspecies. The following 3 subspecies are found in Kenya:

- i) *Giraffa camelopardalis tippelskirchi* commonly called the Maasai giraffe that is native in central and southern parts of Kenya
- ii) *Giraffa camelopardalis reticulate* commonly called the Reticulated or Somali giraffe, that is found in northern parts of Kenya
- iii) *Giraffa camelopardalis rothschildi* commonly called the Rothschild giraffe, Baringo or Ugandan giraffe that is found in protected areas of Kenya including Mt. Elgon, Ruma and lake Nakuru National Parks, Mwea national reserve and several private conservancies/facilities.

3. Capture Challenges due to Giraffe's Unique Anatomy and Physiology

The art and science of immobilisation in the giraffe remains a challenge because of its unique anatomy and physiology which present inherent problems during chemical restraint including:

- Is a large animal with males weighing 790 - 1,400 Kg and females 700-950 Kg. Their large size limits physical control during the critical times of induction and recovery, and limits manipulation once the animal is down
- The long neck if not controlled acts as a lever arm creating a danger to itself or the capture personnel. Also a mal-positioned neck leads to airway obstruction and/or cramping of neck muscles, which can lead to fatalities

- Improper substrate potentates self-induced injury due to slipping during induction and recovery because of the long legs
- Their tendency to vomit or regurgitate can lead to fatal aspiration pneumonia and the posterior position of the larynx in the pharynx hampers draining of any fluid (rumen and/or saliva). Vomiting can result from the increased intra-abdominal pressure occurring when the animal impacts the ground since the skin and muscles over the abdomen are very tense. A rumen bolus can on occasion be seen as it progresses up the neck in some giraffes receiving opioids just prior to or during recumbency
- Prolonged induction and/or recovery can lead to hyperthermia, myopathy and secondary trauma
- The giraffe has elevated systolic blood pressure in order to maintain adequate perfusion in the brain. Thus, anything causing a drop in blood pressure will seriously affect the blood supply to the brain
- The heart has high energy and oxygen requirements to maintain the high blood pressure. If breathing is impaired, the heart soon fails
- The giraffe has a small respiratory tidal volume with a large dead space and relative small cardiac output during anaesthesia. The small respiratory tidal volume makes the species to have limited exercise tolerance while the large respiratory dead space results to considerable resistance to air moving through the long respiratory tract. While an immobilised giraffe may appear to be breathing, it may not be getting sufficient oxygen
- Has the thickest skin of all ungulates. Dart needles therefore must be long (over 50mm)
- Is sensitive to immobilisation drugs which cause profound respiratory depression in the species
- Stands up with difficulties after immobilisation especially if a tranquiliser is used in the immobilisation mixture
- The size of the giraffe is a major factor in the success of the capture procedure with the smaller animals usually having a better success rate than the very large adults due to a combination of factors including the ease of handling the smaller animals and the ability to restrain them easily, therefore using less amount of drugs

4. Planning for Immobilisation and Capture

- Giraffe capture is a complex and dangerous procedure. It requires the capture team to plan and organise the actions that the operation requires. It is very important that the capture must be well coordinated

- Before darting a giraffe, the veterinarian in charge must ensure all equipment, blind folds, ropes, water and personnel (at least 8 experienced capture rangers) are ready. He must also give instructions to the team including human safety issues to avoid any complications during the operation. The sequence of events involved in roping the giraffe, and if unsuccessful the re-attempted roping must be clearly understood by the entire team
- One giraffe is darted at a time. The capture team must have a chase vehicle that must be able to get to the darted animal without any delays
- If the capture is for translocation, the capture team must have a suitably designed field recovery crate for retrieval and short distance transport to the holding facility (boma). The crate will be of appropriate length (about 2.35m), width (1.1 m) and height (2.35 m), mounted on a chassis with dual axles. The ground clearance must be short for stability- the higher the floor, the more unstable the crate will be. The crate is constructed of wood and metal and must be lined with a rubber conveyor belting to minimise injuries to the animals. The floor must provide good grip. This can be provided with a rubber matting. A padded round restraining bar across the front of the crate, about half a metre from the front, prevents the animal from pushing against the front of the crate
- The reversal drugs must be prepared and be ready for administration immediately the animal goes down
- Soft cotton ropes of 25 mm thickness and of appropriate lengths are important part of requirements during capture and translocation of giraffes. The lengths must be as follows:
 - Capture ropes: long ones ($\geq 15\text{m}$) and short ones ($\geq 6\text{ m}$)
 - Loading ropes: $\geq 26\text{ m}$
 - Funnel ropes: $\geq 10\text{ m}$
- If the purpose of the capture is translocation, all requirements prescribed in the Guidelines for Translocation of Wildlife Species in Kenya (2018) must be implemented.

5. Immobilisation Drugs and Darting Techniques

- The objective during any giraffe capture is to achieve a fast and efficient immobilisation with a high dose of the opioid, which is reversed as soon as the animal is cast down. Longer immobilisation time result in hypoxia and death. Table 1 summarises the immobilisation drugs used in giraffe.

Table 1: Recommended dosages for immobilization of giraffe

No.	Age	Etorphine	Thiofentanil	Azaperone	Hyalase
1.	Adult bull	10-16 mg	14-16 mg	40-60 mg	5,000 IU
2.	Adult females	10-12 mg	12-14 mg	40 mg	5,000 IU
3.	Sub-adults	7-9 mg	7-12 mg	40 mg	3,000 IU
3	Juveniles	4-6 mg	4-6 mg	30 mg	1,500 IU
4	Calves	2mg	2mg	20 mg	1500IU

Note:

- Thiofentanil can be used alone without tranquiliser
 - Azaperone should be used judiciously as it cannot be reversed. Excessive doses may result in the animal being disoriented and ataxic after the opioid has been reversed
 - Etorphine and Thiofentanil can be combined at a ratio of 20%:80%
- The terrain is an important factor in capturing giraffes. The ideal terrain is flat or open areas that will allow the capture team to physically bring down the animal when sufficiently anaesthetised
 - Darting is done from a vehicle or helicopter. Approach with a vehicle is at an angle to avoid exciting the animal. Darting can also be done on foot if the animal is approachable. The animal should first be moved towards a suitable open area
 - Darting sites from a helicopter is the rump and back of the hind legs. From the ground, the best sites are the shoulder and hindquarters. The neck should be avoided if possible because of potential of injuring vital organs including the jugular vein
 - After darting, the team must remain quiet, keep the darted animal in sight but not pursue it actively until it is sufficiently anaesthetised to be roped down. Keep within 100-150 m of the animal so that a rapid response can follow signs of induction
 - Signs of induction include the animal running away at a slow pace, stumbling as it runs, holding the head high, drooping of ears and lifting of the muzzle. As drugs take more effect, the animal becomes oblivious of what is in front of it and runs through bushes.
This must be the time to rope down the animal.
 - At least 6 men (≥ 3 at either end of a long rope) intercept the animal. The rope is held across the path of the giraffe at the chest or upper foreleg height. The 6 men then run with the animal, gradually braking its progress until the animal has stopped. The rope is crossed over and pulled. As the giraffe rocks, its feet come together until it can no longer keep its balance and it collapses. Handlers must be wary of the falling giraffe and its feet.

- Once the animal is down the neck of the recumbent giraffe must be extended to ensure a patent airway. The neck is supported by at least 2 capture personnel with the head maintained at knee-height above the rumen and the nose pointed down to facilitate gravity-assisted drainage of any rumen or pharyngeal fluids. The angle of the neck is altered every 10-15 minutes to minimize muscle spasms that occasionally occur. Muscle spasms in a giraffe's neck is life-threatening
- The animal is blindfolded, earplugs placed on the ears and the full antidote (2.5-3 x etorphine dose) is administered IV into the jugular vein. Naltrexone can also be used to reverse the effects of etorphine. It is given IV at 100 mg of naltrexone/mg of etorphine used, plus an additional IM dosage at 25 mg/mg of etorphine used
- Monitoring a recumbent giraffe is critical and should include evaluation of the respiratory function, since respiratory failure usually occurs first, which is rapidly followed by a cascading of events including cardiac depression and death. After a giraffe goes down, respiratory movements are checked and the head and neck extended and elevated to ensure a patent airway. The respiration should be deep and regular and mucus membranes colour should be moist and pink to ensure the animal has responded to the antidote
- Cardiac function is evaluated by auscultation of the chest and palpation of the auricular or mandibular arteries. The use of pulse oximetry is very useful if available
- Overheated animals are doused liberally with water
- The dart is removed and the wound treated with an antibiotic cream
- Personnel must keep out of range of the feet of the animal during capture and handling
- Efforts must be made to get the giraffe back on its feet as quickly as possible

6. Recovery, Boma Holding and Transportation

- The giraffe is processed and loaded by manoeuvring it into the field recovery crate using ropes and transported to the temporary holding facility (boma) while still blindfolded. Blind folds and ear plugs are removed when the animal is being transferred into the boma
- Temporary holding facilities should be at least 4.1m high. The walls can be heightened with a hessian or a plastic curtain. The boma should be provided with shade (trees or artificial), feeding rack and water troughs

- Boma holding period at the capture site will depend on distance to release site. The longer the distance, the longer the holding period. A period of 3 to 4 weeks is recommended
- During holding period in bomas, giraffes can be tranquilized with 10 mg haloperidol or 50-80 mg zuclophenthixol acetate (Clopixol-Acuphase). The tranquillisers are injected just before transfer into the boma
- After the holding period at the capture site, giraffes are transported in a mass crate that should provide at least 3m² for young giraffes and 3.5-4m² for sub-adults and adults
- Tranquilisation should be avoided during transportation as this can lead to unsteadiness and the animal may fall down in the crate which can lead to injuries and other complications
- At the release site, giraffes should preferably be offloaded into a temporary holding facility to recuperate from the effects of transportation before release. The holding period at the release area is determined by the difference in habitat; the bigger the difference, the longer the holding period. The recommended period is 1 to 3 weeks

7. References

- IUCN (1998). Guidelines for Re-Introductions. Prepared by the IUCN/SSC Re-Introduction Specialised Group. IUCN, Gland, Switzerland and Cambridge, UK
- Kock MD and Burroughs R (2014). Chemical and physical restraint of wild animals: A training and field manual for African species, 2nd Edition. South African Veterinary Foundation, Pretoria, S. Africa.
- McKenzie AA (Ed) (1993). Capture, Care, Accommodation and Transportation of Wild African Animals. The Capture and Care Manual pp. 193-208
- Muller, Z., Bercovitch, F., Brand, R., Brown, D., Brown, M., Bolger, D., Carter, K., Deacon, F., Doherty, J.B., Fennessy, J., Fennessy, S., Hussein, A.A., Lee, D., Marais, A., Strauss, M., Tutchings, A. & Wube, T. 2016. *Giraffa camelopardalis* (errata version published in 2017). The IUCN Red List of Threatened Species 2016: e.T9194A109326950. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T9194A51140239.en>.
- Fennessy, J. & Brenneman, R. 2010. *Giraffa camelopardalis* ssp. *rothschildi*. The IUCN Red List of Threatened Species 2010: e.T174469A7077893. <http://dx.doi.org/10.2305/IUCN.UK.2010-2.RLTS.T174469A7077893.en>