

Cheetah Necropsy Guidelines

Why Perform a Necropsy?

Conducting a necropsy after an animal has died means that cause of death can be determined.

Samples collected during a necropsy can also be sent for DNA analysis and to be screened for disease.

These types of data can help in determining possible routes of disease transmission that are a by-product of the illegal trade and the conditions that animals are kept in while they are being transported.

DNA samples can provide information on whether animals in the same shipment are closely related, whether they are likely to have come from the same source population and can also help where they were taken from.

Wherever possible a full necropsy should be conducted by someone with relevant expertise, such as a vet or someone with prior experience of performing necropsies. However, this is not always possible and waiting for an experienced person to be available may mean that important information is lost in the meantime. The instructions in on page 3 are designed to enable someone without prior experience to perform a basic necropsy.

Where it is not possible to perform a necropsy please follow the instructions on page 2.

Health and Safety

Most infectious diseases that affect animals are also contagious to humans – it is therefore important to ensure the safety of people conducting and observing necropsies. Even where animals appear to have died from a non-infectious cause, there may be underlying conditions, therefore it is always important to take basic protective measures.

- Gloves and protective clothing should be worn. Ensure to wash your hands thoroughly with soap after touching the animal or any equipment that has been used during the necropsy.
- Thoroughly clean all equipment and surfaces after the necropsy.
- Do not eat, drink, smoke or touch your face whilst carrying out a necropsy.
- Do not cut towards yourself, or others. If anyone is cut during the necropsy attend to the wound immediately – thoroughly flushing the wound and applying anti-septic. If appropriate, seek medical attention.

If it is not possible to perform a full necropsy

It may not always be possible to perform a full necropsy; however there are three steps which should always be carried out whenever a dead cheetah is found these are:

- **Collection of DNA samples.**
 - Protocols for this are covered in full in Section: *DNA Sampling Guidelines*.
- **Photographs should be taken of the carcass.** These should include:
 - Photographs of the full body view of both sides of the cheetah, as well as pictures showing the spot patterns on both side of the cheetah's face. Taking full body and face photographs of carcasses may enable the cheetah to be traced to its site or country of origin. It may also help to eliminate the possibility of it being of captive origin.
 - Photographs should also be taken of any wounds or abnormalities on the carcass, ideally including a ruler in the photograph, to provide a scale, so that the size of the wound/abnormality can be determined from the photograph. If a ruler is not available then use another object, such as a coin, to indicate scale.
- **External Examination**
 - Conduct a visual examination of the animal. Note:
 - any visible wounds and abnormalities (and ensure all have been photographed).
 - Describe the animal's body condition (e.g. normal/underweight).
 - Look at the animal's reproductive state – if a female, are there signs of pregnancy or lactation? (Lactation can be determined by full mammary glands, and by matted fur, leaving large brown stains around the teats from where the cubs have been suckling).
 - Conduct a physical examination of the body. Palpate along the cheetah's bones to determine if any feel as though they are broken. Feel the length of the cheetah's spine and tail to determine if there has been an injury.
 - Complete the external examination form

Basic Necropsy

Equipment required

Essential:

- Necropsy data forms
- Pen / pencil
- Camera (or phone with camera function)
- Scalpel handles and blades
- Hacksaw
- Forceps
- Scissors

Useful:

- Clipboard
- Strong, sharp knives
- Sharpening steel or stone
- Rib cutters

Instructions

1. **Conduct a visual examination of the animal.** Take full body photographs of both sides of the animal. Note and photograph any visible wounds and abnormalities Record the animal's body condition e.g. normal/underweight/ribs visible. Complete the External Examination Form.
2. **Collect DNA samples** - see Section: *DNA Sampling Guidelines* for further information about DNA sampling.
 - a. Collect skin samples by cutting approx. 1cm x 1cm sections. Put samples in TES or >90% ethanol – these can then be stored at room temperature. If not available, then freeze samples at <-18°C. If none of these options is available then skin samples should be cut into very thin slices (~2mm), left to dry and then put into a new, clean paper envelope and stored in a cool, clean, dry place.
 - b. Ensure samples are appropriately and fully labelled (see Section: *DNA Sampling Guidelines*) so that they can be identified as having come from a particular animal.
3. **Pluck (do not cut) some hair** – this is often most easily done from the end of the tail or neck area, where the hair is longer and therefore easier to grasp. Ensure hairs have the root/follicle attached – as this holds the DNA. Take several samples of at least 20 hairs in each. Put each sample into a new, clean paper envelope and store in a cool, clean, dry place.
4. Put the carcass on its left side. Cut into the right armpit and hip joints and turn back both right legs out of the way. Make a shallow incision along the ventral (belly side) midline cutting through the skin from the chin to the pelvis. By rolling back the skin and cutting underneath, peel the skin back from the underside of the animal. Note any signs of bruising (haemorrhage under the skin) as you do this.
5. Open the abdominal cavity by carefully cutting through the abdominal muscle wall from the midpoint of the rib cage (the xiphoid cartilage) along the last rib; avoid cutting into the intestines. Extend the incision and remove the muscle wall so that the abdominal organs are visible. Determine whether the organs are in their appropriate positions but leave them in place at this point. Note any abnormal contents in the cavity.

6. Cut through the diaphragm (the muscle at the base of the rib cage) and remove the right half of the ribcage using the hack saw (or rib cutters if available). Examine the organs in the chest cavity, but leave them in place at this point.
7. Cut through the muscles along the inside of the lower jaw; grasp and pull the tongue through the lower jaw. Cut the hyoid apparatus (voice box) and draw the tongue, oesophagus and trachea together to the level of the chest cavity. The oesophagus is the muscular pipe running from the back of the mouth to the stomach. The trachea is the ridged pipe (ridges are rings of cartilage which hold the pipe open) running from the back of the mouth to the lungs. Keep the tongue, oesophagus and trachea attached to the heart and lungs but begin to remove them, cutting attachments as necessary; then cut the oesophagus and major blood vessels at the diaphragm in order to free the organs from the carcass. You will now examine these organs more closely. If you are not sure whether something is normal or not, describe it as fully as possible on the datasheet and take photos (including your scale indicator in each photo).
 - a. Examine the tongue and oral cavity (mouth). Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
 - b. Feel along the oesophagus before opening it. Examine the inside of the pipe for signs of nodules or parasites. Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
 - c. Palpate the lungs and note their colour and texture. Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
 - d. Cut open the trachea (wind pipe) and examine the inside. Extend the cut along the pipe into the lungs. Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
 - e. Open the pericardium (the fibrous sac enclosing the heart). The fluid inside should be clear and straw coloured; look for abnormalities in the fluid eg does it look bloody? Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
 - f. Examine the heart. Determine if the size and shape is normal, if in doubt take a photograph. Look at the outer surfaces for any haemorrhages or pale patches. Open the heart and look at the ventricles and atria, look for signs of haemorrhage and look for lesions on the valves (flaps of tissue separating the chambers of the heart). Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
8. Next examine the abdominal organs. Note – examine the intestines last as they may contaminate the rest of the carcass.
 - a. Examine the liver. Note any abnormalities on datasheet, such as lesions or other irregularities, on the datasheet (or write appeared normal if applicable). If in doubt take a photograph.
 - b. Locate the kidneys and remove them. Cut through and remove the capsule around the kidneys and examine all of the surfaces both inside and out. Note any abnormalities, such as lesions or other irregularities, on the datasheet (or write appeared normal if applicable). If in doubt take a photograph.
 - c. Examine the bladder. Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).
 - d. Remove the stomach and intestines, cut all the attachments in order to separate the loops of the intestine from each other. Open the stomach and continue down the length of the intestine to the

rectum, noting signs of parasites. Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable).

- e. If a female cheetah, examine the uterus. Look for signs of pregnancy, and note the number of fetuses if present. Note any abnormalities on the Internal Examination Form (or write appeared normal if applicable). If in doubt take a photograph.
9. Check the datasheet is completed. Check samples are fully labelled and stored appropriately. Carefully dispose of carcass, ensuring that parts e.g. skin are appropriately disposed of. Thoroughly clean the work area and all equipment.

1.1. Detailed Necropsy

Where an experienced person, such as a vet or someone with prior experience of performing necropsies, is available to perform a detailed necropsy they should do so. Munson *et al.* (2006) gives detailed, step-by-step instructions on performing a necropsy on wild carnivores. Further information is also available from the IUCN Wildlife Health Specialist Group.

Munson, L., Karesh, W.B., McEntee, M.F., Lowenstine, L.J., Roelke-Parker, M.E., Williams, E., Woodford, M.H. and Haines, D., 2006. Necropsy of wild animals. Wildlife Conservation Society.

<http://www.cldavis.org/ghpn/tools/Necropsy%20of%20Wild%20Animals.pdf>

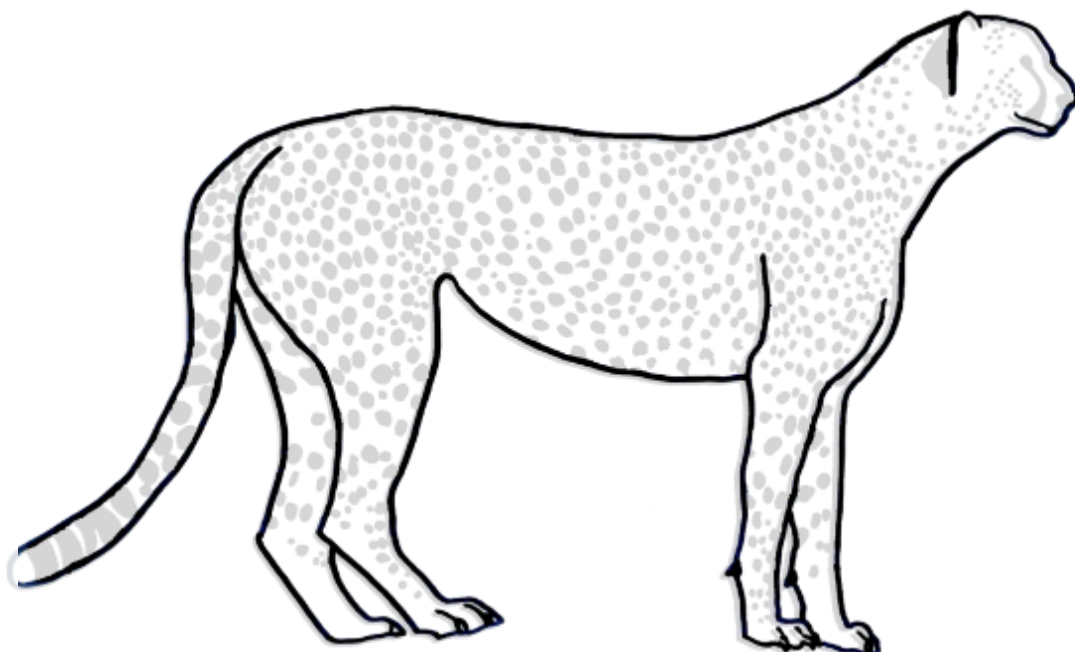
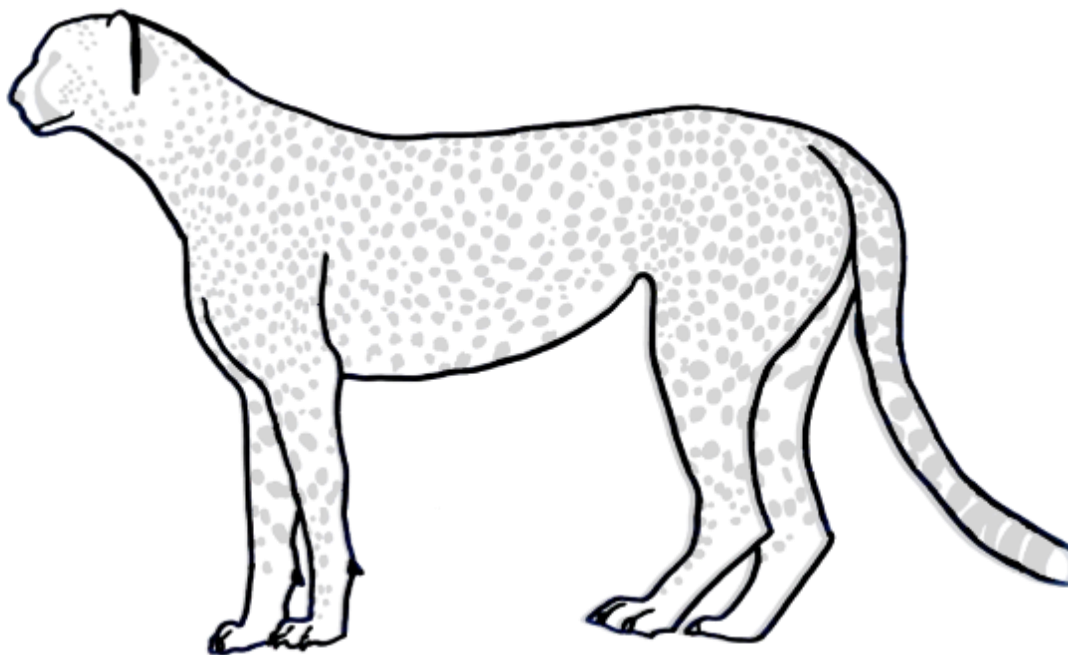
Cheetah Necropsy - External Examination Form

Date of Death:	Date Examination Performed:
Necropsy Reference Number:	Examination Performed by: Please include agency and contact details
Cheetah ID:	
Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	Condition of Carcass:
Age Class:	
Was Cheetah Euthanised? <input type="checkbox"/> Yes <input type="checkbox"/> No	
<i>History of Case</i> When Seizure Occurred: Where Seizure Occurred: Case Reference Numbers:	
DNA samples collected:	
Clinical History (ie any treatments given before death)	
Description of Visible Injuries, Wounds and Abnormalities: (use diagrams overleaf to mark locations of observed wounds and abnormalities)	
Diagnoses / Cause of Death:	
Body Weight:	Head-body length:
Tail length:	Shoulder Height:
Chest Girth:	Belly Girth:

Date:	Necropsy Reference Number:
Cheetah ID:	Seizure Case Reference Numbers:

Mark outlines below with wounds and abnormalities identified during external examination.

Please label and describe as fully as possible (including approximate size) and reference numbers for photographs taken



Cheetah Necropsy - Internal Examination Form

Date:	Necropsy Reference Number:
Cheetah ID:	Seizure Case Reference Numbers:
Abdominal Cavity Examination:	Chest Cavity Examination:
Tongue and Oral Cavity:	Oesophagus:
Lungs:	Trachea:
Pericardium:	Heart:
Liver:	Kidneys:
Bladder:	Stomach:
Intestines:	Uterus (if female):
Notes:	

