

**Tamil Nadu Forest Department**  
**Advanced Institute for Wildlife Conservation (Research, Training & Education)**  
**Vandalur - 600 048**



# **Wild Animal Carcass Management Guidelines**





# Wild Animal Carcass Management Guidelines

Wildlife Policy Research Document  
Tamil Nadu Biodiversity Conservation and Greening  
Project for Climate Change Response (TBGPCCR)  
2024-2025



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Photo: Indian vulture (*Gyps indicus*) feeding on a cattle carcass at the Satpura Tiger Reserve, Madhya Pradesh.

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## **FOREWORD**

The Wild Animal Carcass Management Guidelines, developed by the Advanced Institute for Wildlife Conservation (AIWC) in Tamil Nadu, provide a structured and scientific approach to managing wild animal carcasses in natural landscapes. The need for such guidelines has long been felt, and AIWC has stepped in to fill this critical gap. A recommendation was also made during the 3rd meeting of the Tamil Nadu State-Level Committee for Vulture Conservation regarding the need to develop a protocol for the safe disposal of carcasses. AIWC has worked towards this objective, resulting in the development of these comprehensive guidelines. These guidelines will serve as a valuable tool for frontline forest staff and veterinarians, providing a clear protocol for handling wild animal carcasses arising from natural deaths, poaching, disease outbreaks, or human-wildlife conflict.

It is important to recognise that wild animal carcasses are not merely remnants of death but integral components of thriving ecosystems. When left undisturbed in their natural habitat, they play a vital role in sustaining scavenger species, enriching soil fertility, and facilitating the transfer of energy and cycling of nutrients through the ecosystem. This natural process supports biodiversity, strengthens food webs, and maintains ecological balance.

I commend AIWC for its scientific rigour and thoughtful consideration in preparing these guidelines. These guidelines bridge the gap between ecological principles and practical field implementation.

**(Rakesh Kumar Dogra)**  
**PCCF & Chief Wildlife Warden**

**Date: 14-08-2025**



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## **PREFACE**

In the wild, an animal's death is not the end of a life cycle but the beginning of many others. Carcasses play a vital ecological role, serving as a foundation for complex food webs, supporting scavenger species, enriching soils, and facilitating the transfer of nutrients and energy across ecosystems. Far from mere waste, they are essential components of natural processes that sustain biodiversity and ecological balance.

Large animal carcasses, despite their ecological role, are often disposed of through burning or burial to curb illegal activities. This unchecked intervention may disrupt nutrient dynamics and compromise ecosystem stability. Recognising this, there is a growing need for a straightforward, science-based approach to carcass management in wild ecosystems, including Reserved Forests and Protected Areas.

Hence, the Advanced Institute for Wildlife Conservation (AIWC) has developed the 'Wild Animal Carcass Management Guidelines'. These guidelines aim to offer a practical yet ecologically robust framework for frontline forest personnel and veterinarians to manage wild animal carcasses in a manner that supports conservation goals.

These guidelines advocate for the natural decomposition of carcasses. This document outlines technical protocols and emphasises the importance of allowing nature to take its course. I commend the efforts of Dr. T.T. Shameer, Dr. D. Evangeline, and other team members in developing these guidelines. The guidance provided by the senior members of AIWC and the peer reviewers is also deeply acknowledged. Funding from the Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response (TBGPCCR) has been crucial in developing these Guidelines.

**(A. Udhayan)**

**PCCF & Director, AIWC**

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### **List of Abbreviations**

- **BCS** – Body Condition Score
- **CCTV** – Closed-Circuit Television
- **CWD** – Chronic Wasting Disease
- **DNA** – Deoxyribonucleic Acid
- **Gt C** – Gigatons of Carbon
- **K3EDTA** – Tripotassium Ethylenediaminetetraacetic Acid
- **MoEFCC** – Ministry of Environment, Forests, and Climate Change
- **NTCA** – National Tiger Conservation Authority
- **PA** – Protected Area
- **PE** – Project Elephant
- **RF** – Reserved Forest
- **SOP** – Standard Operating Procedure
- **WII** – Wildlife Institute of India

## 1. Introduction

### 1.1 Ecological Importance of Carcass

Carcass is a vital nutrient source for many organisms, including vertebrates, invertebrates, microbes, and plants. It supports species across all biological kingdoms, facilitating the reintegration of carrion-derived nutrients into ecosystems at every trophic level (Butler-Valverde *et al.*, 2022). Proper management of wild animal carcasses has a strong influence on the ecological integrity of ecosystems. Wild animal carcasses have a significant influence on the structure and functioning of ecosystems, and their impact extends to biodiversity conservation. The carrion of animals in the wild contributes to nutrient recycling processes and serves as a source of energy for the scavengers. The necrophagous network, including vertebrate scavengers, supports and regulates ecosystem services through nutrient cycling and carcass removal from the landscape, thereby mediating quality. (Stiegler *et al.*, 2020).

The significance of carrion in terrestrial ecosystems highlights the idea that scavenging contributes more to energy transfer within terrestrial food webs than predation. Connections between carcasses, populations, communities, and ecosystems help estimate carrion biomass at various scales, showing that data from single carcasses offer insight into ecological processes at a very large spatial scale (Newsome *et al.*, 2021). Carrion biomass plays a significant role in ecosystem energetics, structure, and function by rapidly releasing rich nutrients. The carbon-to-nitrogen ratio is lower in plant material, so carrion has greater metabolic rewards than most plant tissues. Carrion is highly attractive to various decomposers and scavengers, which comprise a necrobiome (Barton *et al.*, 2019).

### 1.2 Nutrient Cycle and Biomass Allocation

The Earth's total biomass is estimated to hold approximately 550 gigatons of carbon (Gt C), encompassing all life forms. About 80% comprises land plants (embryophytes), while bacteria contribute 15%. The remaining biomass, which accounts for less than 10%, comprises fungi, archaea, protists, animals, and viruses, in descending order of their contributions (Bar-On *et al.*, 2018). This vast distribution highlights the diversity of life and its integral role in maintaining the balance of ecosystems. Ecosystems provide numerous services increasingly

valued for their economic and ecological importance. These services include nutrient cycling, carbon storage, air and water purification, and flood control, all of which are crucial to sustaining Earth's life-support systems (Zhao *et al.*, 2004). Among these, nutrient cycling alone contributes to 69-89% of ecosystem functioning, underscoring its significance. Nutrient cycling involves the movement of chemical elements essential for plant growth. Plants absorb these elements as inorganic compounds in water. Non-mineral elements such as carbon (C), hydrogen (H), and oxygen (O) make up approximately 95% of living organisms and are derived from water and carbon dioxide. Macronutrients such as nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), and magnesium (Mg) are required in large amounts for growth. At the same time, micronutrients such as boron (B), copper (Cu), iron (Fe), manganese (Mn), and zinc (Zn), though needed in smaller quantities, remain vital. These nutrients support plant metabolism and growth, driving critical ecosystem processes such as decomposition, which are essential for sustaining life on Earth (Mehta & Jain, 2021).

## 2. Scavengers and carcass utilization

### 2.1 Role of Scavengers

Scavengers are animals that consume carcasses, whether partially or entirely, regardless of whether the carcasses were killed by other species or through other means. Scavenging is recognised as a widespread feeding behaviour that contributes significantly to maintaining ecosystem services (Inagaki *et al.*, 2022). Scavengers play a critical role in recycling nutrients and maintaining ecosystem health. Scavengers play a crucial role in recycling nutrients and maintaining the health of ecosystems. They can be divided into two distinct groups: those that rely on carrion for survival and reproduction, known as obligate scavengers, and those that scavenge opportunistically but do not depend on carrion for survival or reproduction, known as facultative scavengers (Beasley *et al.*, 2015). Scavengers can also be categorized into detritivores, necrophagous, and coprophagous organisms, each contributing uniquely to the decomposition process. Detritivores feed on decaying organic matter, such as leaves, roots, branches, or fruits, rather than animal protein, like carrion or faeces. As they break down this detritus, they contribute to the formation of humus, enriching the soil with organic matter. Detritivores include insects like dung beetles, termites, ants, and fly larvae (Sarcophagidae and Calliphoridae). These insects accelerate decomposition, ensuring nutrients are quickly returned to the soil. Beetles, particularly those from the Scarabaeidae family, and termites decompose complex organic materials into simpler substances, further enriching the soil (Rupali *et al.*, 2024).

Detritivores are vital for ecosystem health, recycling up to 95% of nutrients back into the ecosystem. Detritus-based food webs account for as much as 95% of primary productivity in ecosystems like grasslands, deserts, and forests. Their decomposition activities facilitate the exchange of nutrients and energy between aboveground and belowground components, maintaining ecosystem productivity (Yang, 2005).

Necrophagous scavengers feed on carrion, while coprophagous scavengers consume faeces or dung. Necrophagous species include insects like beetles from the Silphidae and Dermestidae families, as well as vertebrates like hyenas (Hyaenidae) and vultures (Accipitridae and Cathartidae). Coprophagous organisms, such as fungi and beetles from the Scarabaeidae, Geotrupidae, and Hybosoridae families, feed on the organic matter found in faeces (Olea *et al.*, 2019; Galante & Marcos, 1997). Both chemical and biological processes further drive the decomposition of carrion. Intrinsic factors, such as autolysis and putrefaction, along with extrinsic drivers like the release of microbial enzymes, break down carrion, release energy, and recycle nutrients. The early stages of decomposition release gases that attract insects, which feed on the fluids and tissues. Vertebrate scavengers further fragment the carcass by consuming larger tissue portions, accelerating nutrient recycling (Barton & Bump, 2019).

## 2.2 Carcass utilisation by scavenger communities

The structure of vertebrate and invertebrate communities is a critical factor determining carrion availability for vertebrate scavengers. Neotropical forests provide more food for vertebrate scavengers compared to Afrotropical forests. This is due to the higher biomass and smaller average size of herbivorous mammals in Neotropical forests, resulting in faster rates of turnover. Additionally, interactions within the invertebrate community, such as ants suppressing maggot infestations, extend carrion availability to over 10 days in Neotropical forests. In contrast, Afrotropical forests experience rapid consumption of carrion, where fly larvae can completely consume 2–10 kg of carcasses within three days (Devault *et al.*, 2003).

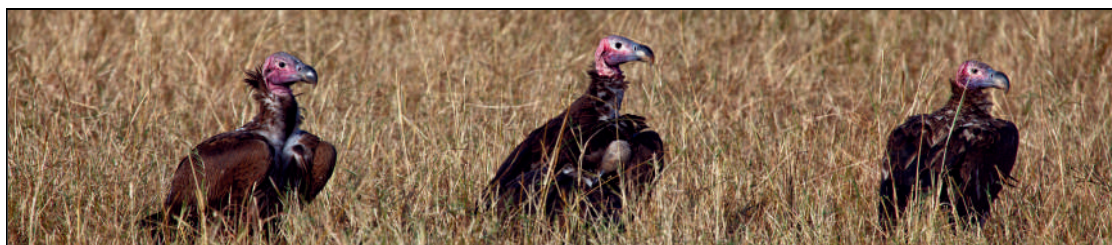


Carion significantly impacts food chains and the environment, serving as sustenance for necrophagous species (Barton et al., 2013). Fresh carion is nutritionally similar to prey obtained through hunting, but requires far less risk and effort. Scavenging can transfer up to 16 times more energy through ecosystems than predation (Wilson & Wolkovich, 2011). Addressing wildlife mortality and implementing policies for scavenger conservation is crucial for maintaining ecological balance.

The extended availability of carion in certain regions supports a broader range of scavenging bird species. Avian scavengers tend to feed on carnivore and omnivore carcasses, which pose a lower risk of disease transmission than those of herbivores. This combination of prolonged carion presence and reduced health risks makes carnivore carion a vital resource for avian scavenger populations (Butler-Valverde *et al.*, 2022). Predators also compete for access to meso-herbivore carcasses due to their widespread availability. Meanwhile, mega-carcasses, such as those of elephants, provide significant carion biomass and remain accessible for extended durations. The persistence of elephant carcasses in the landscape allows a broader range of species to utilise the resource (Morris *et al.*, 2023). Carcass size determines the consumption rate and proportion of carion biomass consumed. Facultative scavengers, especially large mammalian carnivores, account for the majority of carion consumption. A study by Moleón *et al.* (2015) investigating the structure and functioning of an African scavenger assemblage revealed that hyenas were the dominant consumers across carcass sizes, accounting for 47.60% of the biomass consumed from small carcasses, 83.33% from medium-sized ones, and 100% from large ones. Lions followed in importance, contributing 4.83%, 41.70%, and 62.50% of consumption for small, medium, and large carcasses, respectively. The presence of vultures and avian facultative scavengers increased with carcass size, while mammalian meso-carnivores were notably absent from medium and large carcasses. Scavenger community composition shifts with carcass size—large carnivores consistently lead, avian scavengers expand their role in larger carcasses, and mesocarnivores withdraw. Larger carcasses attract dominant and aerial scavengers due to the higher energy payoff and competitive exclusion, which limits access for smaller carnivore groups.

### 2.3 Apex Scavengers

Apex scavengers can be defined as large bodied animals which are specialized consumers of carion, or animal remains. Larger obligate and facultative scavengers play a crucial role in efficiently consuming carion and regulating carion use.



Vultures, known as obligate scavengers, depend solely on carrion. They are considered as apex scavengers and possess a highly developed sense of smell and sharp eyesight, which helps them locate carrion. Raptors also play essential roles, particularly in the absence of vultures. When vultures are absent, facultative avian scavengers such as the House Crow (*Corvus splendens*), Jungle Crow (*Corvus macrorhynchos*), Black Kite (*Milvus migrans*), Brahminy Kite (*Haliastur indus*), Steppe Eagle (*Aquila nipalensis*) can quickly consume carrion and even out-compete larger mammalian scavengers (Whelan *et al.*, 2008; Mateo-Tomás *et al.*, 2015).

The contribution of scavengers to carrion consumption varies due to their differing abilities to locate and ingest carrion (Kane *et al.*, 2016). Vultures are nature's most successful scavengers; in the Indian subcontinent, nine vulture species exist, and five species are present in southern India, which are the Egyptian vulture (*Neophron percnopterus*), Red-headed vulture (*Sarcogyps calvus*), White-rumped vulture (*Gyps bengalensis*), Long-billed vulture (*Gyps indicus*), and Cinereous vulture (*Aegypius monachus*). Vultures inhabit various vegetation types, including thorn Forests, dry deciduous forests, moist deciduous forests, riverine Forests, and semi-evergreen forests, with a preference for thorn Forests (Samson *et al.*, 2016).

Among mammal species, striped hyenas (*Hyaena hyaena*) feed on a variety of vertebrates, invertebrates, and vegetation, playing a crucial role in consuming dead and decaying bodies and recycling dead organic matter (Kruuk, 1976). These facultative scavengers coexist with other carnivores and occupy habitats ranging from arid and semi-arid regions to the wet zones of the southwestern coast in the Indian subcontinent (Gupta *et al.*, 2021).

## 2.4 Meso-Scavengers

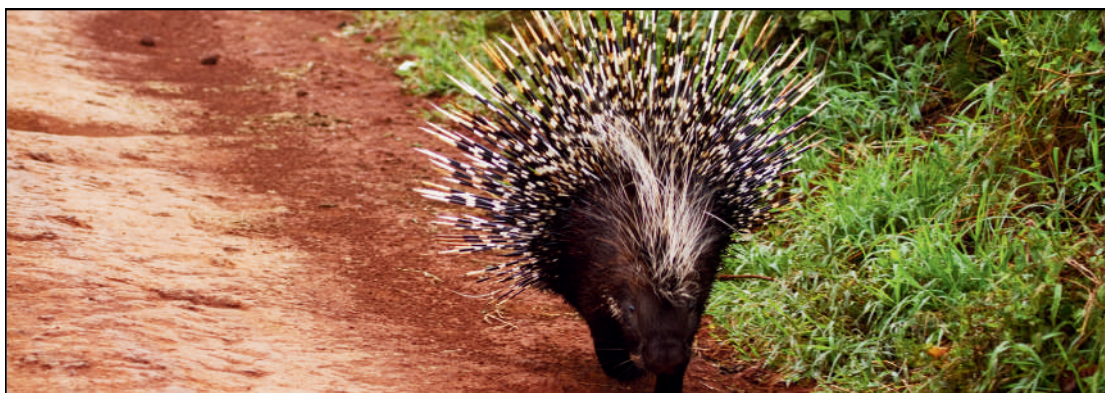
"Meso scavengers" refers to a group of mid-sized animals that act as facultative scavengers. The absence or removal of apex scavengers may allow meso-scavengers to access carrion throughout the year rather than only during resource-limited periods (Fielding *et al.*, 2021). Various species of meso-scavengers occupy different ecological niches. Species such as the Golden Jackal (*Canis aureus*) are secondary scavengers that inhabit diverse environments, ranging from deserts to tropical evergreen forests. They can be found in both urban and rural areas, and primarily scavenge on carcasses, birds, reptiles, insects, and rodents (Aiyadurai & Yadvenradev, 2006).

The Indian fox (*Vulpes bengalensis*) inhabits relatively dry areas, including scrub thorn forests, deciduous forests, short grasslands, and marginal croplands. Its range spans biogeographical zones, including the desert, semi-arid, and the Deccan Peninsula of India (Kumara & Singh, 2012). The fox is a generalist species that forages on a wide range of foods, including carrion, arthropods, birds, rodents, fruits, seeds, and grasses (Home & Jhala, 2009).

Sloth bears (*Melursus ursinus*) inhabit various habitats, including moist and dry deciduous forests, scrubland, thorn scrub, and grasslands. They may also be found near human habitation, especially in central India (Philip *et al.*, 2022). The Sloth Bear scavenges on carrion and is a generalist species that consumes around 21 species of plants, as well as termites, ants, and bees (Bargali *et al.*, 2004). The wild pig (*Sus scrofa*) is a generalist species that has achieved remarkable global population expansion. This adaptability enables them to thrive in diverse habitats, such as semi-deserts, wetlands, forests, and high-altitude mountain regions (Milda *et al.*, 2022). Wild pigs exhibit omnivorous and opportunistic feeding behaviour. This adaptability enables them to exploit a wide range of food resources, including invertebrates, birds, reptiles, amphibians, small and large mammals, and carrion. They are recognized as efficient contributors to the scavenging community. However, their diets are often characterized by high fibre content, low energy levels, and seasonal protein deficiencies (Grey *et al.*, 2019). Similarly, various mongoose species are also known to be facultative scavengers. For example, the brown mongoose is known to scavenge on the carcasses of larger mammals such as the gaur (*Bos gaurus*). Notably, it has also been observed feeding on a Nilgiri langur carcass (Kamath & Seshadri, 2019).

## 2.5 Osteophagic Scavengers

Rodents are known to gnaw on dry bones (Klippel & Synstelien, 2007). Rodents gnaw on weathered bones to maintain their incisors and obtain minerals lacking in their diets. Species such as African porcupines, deer mice, and rats have been observed gnawing, dispersing, and even accumulating bones in their dens (Pokines *et al.*, 2016). Although there are limited reports of other rodent species gnawing on bones in forests, studies on porcupines highlight their importance in cleaning carcasses by gnawing on bones. Porcupines have a varied diet. The Indian crested porcupine, a widely distributed rodent in the subcontinent, inhabits a diverse range of environments, including temperate scrublands, grasslands, forests, the Steppe Mountains, sandy deserts, and caves (Gurung & Singh, 1996). They are a generalist forager exploiting a wide range of cultivated and wild plants, consuming both hypogeal and epigeal plant tissues. Studies have also revealed that bones constitute 6.03% of their diet (Akram *et al.*, 2017).



## 2.6 Necrophagous Scavengers

Insects, conversely, are the micro army, which silently comes first and converts the carrion into rich manure (Kyerematen *et al.*, 2012). Insects play a crucial role in decomposing organic waste, such as dung and carrion. Many insect species specialize in consuming different types of carcass tissues. Flies, in both adult and larval stages, are the most commonly associated arthropods with carrion and represent the largest biomass in a carcass. They can consume more than half of the original carcass mass. Families such as Calliphoridae, Sarcophagidae, and Muscidae are typical carrion fauna. The Dermestidae family, with about 600 species of beetles, typically arrives later in the decomposition process but can also appear early. Beetles of the genus Dermestid are crucial in decomposing human and animal remains (Shrivastava *et al.*, 2022). Around 4,000 dung beetle species significantly contribute to manure decomposition and the carbon cycle, reducing greenhouse gas emissions by 7-12%. Beetle larvae, flies, ants, and termites break down dead plant matter, aiding microbial decomposition. In dry and hot regions, ants and termites enhance soil mineral nitrogen. Carrion decomposition is characterized by a diverse insect community, especially flies and beetles. Calliphorid flies initiate a dynamic succession of arthropod species on carrion (Ahmad & Dar, 2020).

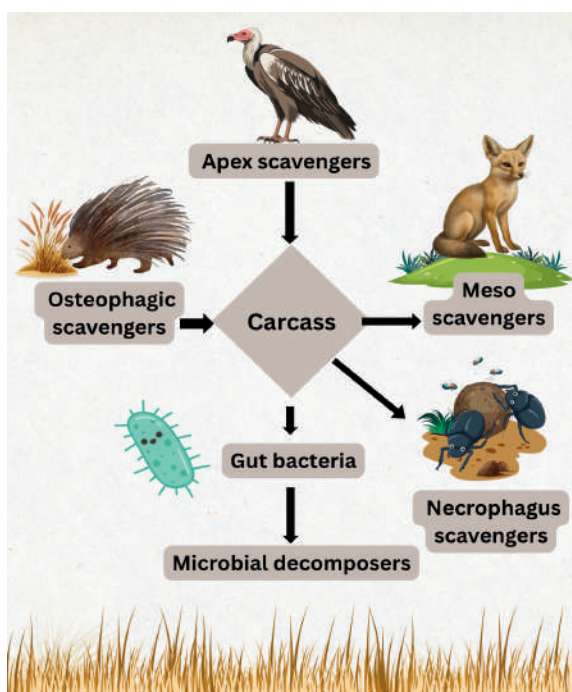


*Ants scavenging on the carrion of a Buff-striped Keelback (Amphiesma stolatum).*

## 2.7 Microbial Decomposers

Microbial decomposers (bacteria, archaea, fungi, protists) are critical in carrion decomposition (Metcalf *et al.*, 2015). The decomposition of a carcass is influenced by its size, which impacts both the rate of decomposition and the types of organisms that use it as a food source. Larger carcasses can contain approximately 210,000 fly larvae, which generate heat and increase internal temperatures. This accelerates microbial and intrinsic decay processes compared to smaller carcasses, which cannot support large maggot masses (Braack, 1987). Several taxa from the Firmicutes and Bacteroidetes phyla are among the primary aerobic bacteria in carrion. Anaerobic bacteria, such as the commonly known *Lactobacillus*, *Streptococcus*, and *Staphylococcus*, play a crucial role in fermenting various organic compounds (Forbes & Carter, 2015). As conditions on older carcasses become drier and more hostile for bacteria, fungi tend to become more prevalent (Carter & Tibbett, 2003).

Fresh carrion enters the bloat stage within minutes to hours after death, as internal bacteria proliferate and release gases such as methane, hydrogen sulphide, and carbon dioxide (Forbes & Carter, 2015). These gases attract carrion insects, such as blowflies, to the carcass. Several bacterial genera, including *Staphylococcus*, *Candida*, *Malassezia*, *Bacillus*, and *Streptococcus* spp., occur sequentially during early decomposition. It is then followed by a transition to anaerobic bacteria like micrococci, coliforms, diphtheroids, *Clostridium* spp., *Serratia* spp., *Klebsiella* spp., *Proteus* spp., *Salmonella* spp., *Cytophaga*, additional pseudomonads, and flavobacteria, which together convert the carrion into nutrition (Benbow *et al.*, 2015).



Different groups of scavengers which depend on carcasses

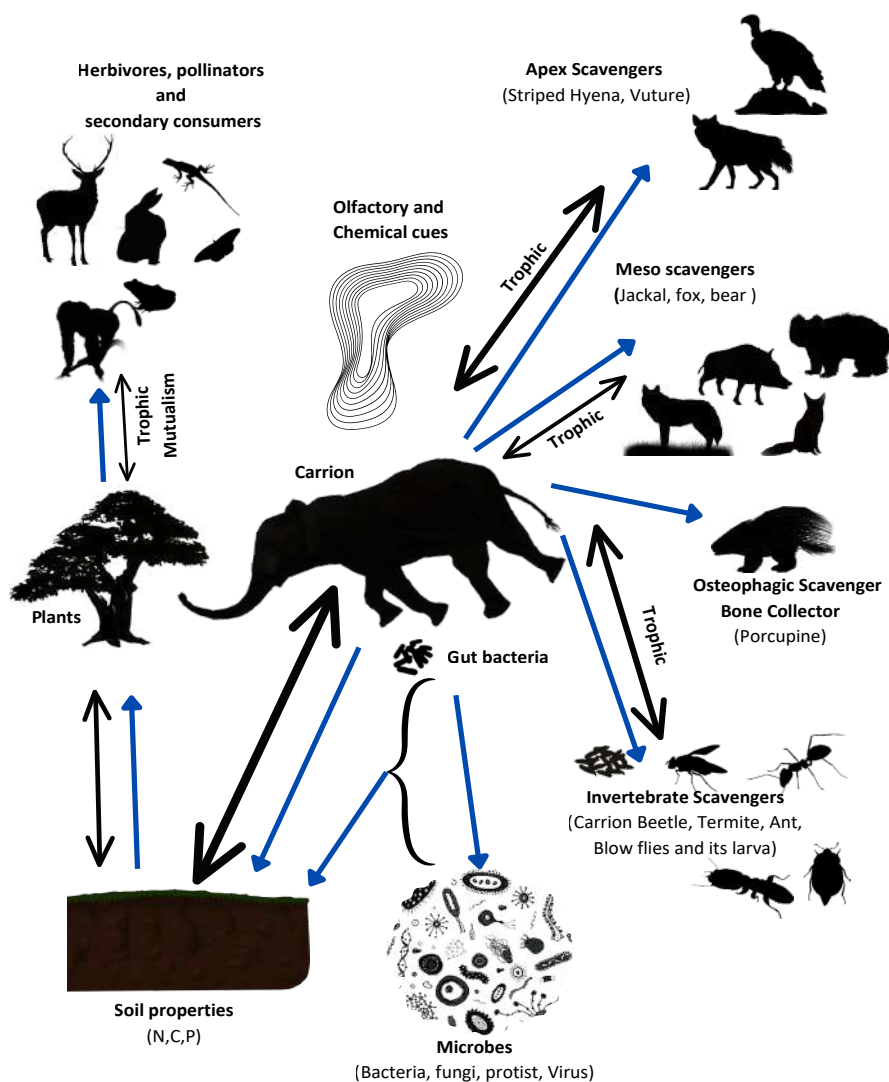
### 3. Carcasses and the social dimension of wild animal behaviour

Across the animal kingdom, many species exhibit remarkable emotional responses to the death of their kind, reflecting strong social bonds and possibly even grief (Zych & Gogolla, 2021; Brauer *et al.*, 2020; Bekoff, 2000). Elephants, for instance, are known to interact with the remains of others, often touching and examining bones—even those of unrelated individuals. Studies like those of McComb *et al.* (2005) reveal that elephants spend more time with elephant remains than with inanimate objects or other species, suggesting a profound social awareness. African elephants are primarily known for this behaviour, which points to complex emotional and cognitive processing (Douglas-Hamilton *et al.*, 2006).

Various animal species display behaviours that suggest mourning and emotional bonding (Bryce, 2022). Chimpanzees, for example, have been observed grooming deceased companions, staying near their bodies, showing signs of distress, and avoiding the location of death for several days (Koerth-Baker, 2013). Yellow-billed magpies, as noted by the Cornell Lab of Ornithology, respond to the death of a fellow bird by squawking, hopping around the body, and placing grass beside it, actions resembling a form of funeral ritual. In marine environments, orcas have been seen carrying their dead calves for days, while pilot whales often linger beside deceased pod members, sometimes refusing to leave even when prompted by researchers. These behaviours indicate that grief and mourning may not be exclusive to humans (Pierce, 2013).

Similarly, giraffes are known for their social nature and communal care of their young. In one reported case, after a calf's death, the mother and other females in the herd exhibited noticeable behavioural changes. While the term "grief" was not explicitly used, their actions suggested they were deeply affected by the loss (King, 2013). Animals exhibit emotional responses to death, reflecting deep social bonds. Hence, humans need to treat animal carcasses with understanding and allow the other animals the dignity to process their loss naturally. Additionally, this awareness is important from a safety perspective, as first responders or investigators approaching a carcass site must be cautious not only to respect animal social behaviour but also to protect themselves from potential threats such as distressed or protective group members, zoonotic disease risks, or other environmental hazards.





### Importance of carrion in the nutrient cycle and trophic interactions

The above infographic illustrates how animal carcasses (carrion) serve as a central node supporting multiple trophic levels and ecological processes. Carrion directly sustains apex scavengers (e.g., striped hyenas, vultures), mesoscavengers (e.g., jackals, foxes, bears), osteophagic scavengers (e.g., porcupines), and invertebrate scavengers (e.g., carrion beetles, ants, blowflies). It also facilitates microbial decomposition (by bacteria, fungi, protists, and viruses), which enriches soil nutrient properties (notably nitrogen, carbon, and phosphorus). These enhanced soil conditions promote plant growth, which in turn supports herbivores and pollinators, thereby completing the cycle. Additionally, olfactory and chemical cues from carrion influence animal behaviour and movement, reinforcing ecological connectivity. The diagram emphasizes the ecological importance of carcass management in maintaining biodiversity, nutrient cycling, and ecosystem health.

## **4. Existing Standard Operating Procedures (SOP) on wild animal carcass disposal**

### **4.1 NTCA & MoEFCC SOP on disposal of dead wild animals**

The National Tiger Conservation Authority (NTCA), a statutory body under the Ministry of Environment, Forests, and Climate Change (MoEFCC), has prepared a Standard Operating Procedure (SOP), 2013 for disposing of tiger/leopard carcasses and body parts. This SOP was developed to ensure proper management and transparency in sensitive cases. Species protected under the Wildlife (Protection) Act 1972 require specialized care due to their ecological, legal, and conservation importance. The above SOP emphasises that if tiger or leopard parts, whole bodies or seized or confiscated parts are found inside or outside protected areas, they must be entirely incinerated under the supervision of the Field Director/Authority in charge and the post-mortem (PM) team. Furthermore, the incineration process must be documented with videos or photos.

The PE-MoEF&CC-WII (2023) provides the Operating Procedure on Necropsy and Carcass Disposal of Asian Elephants. This document also puts forward the importance of in situ practices, such as leaving elephant carcasses in good condition to decompose naturally in the field. Elephant carcasses affected by Anthrax must be burned completely and should in no case be buried according to the above document.

### **4.2 Need for comprehensive Carcass Management Guidelines**

Wild animals like elephants, tigers, leopards, deer, etc., die due to various reasons, such as natural death, predation, disease, electrocution, accidents, human-wildlife conflict, poaching, and poisoning. Considering the ecological role and importance of carcasses, as well as the fact that current management practices often overlook the ecosystem's benefits from these carcasses, there is a need for standard guidelines in carcass management. Therefore, this document has developed a standard guideline which is helpful in the management of wild animal carcasses. The bottom line is to ensure that most, if not all, carcasses are made available to the natural processes in wild ecosystems. The guidelines outlined in this document aim to promote carcass management to conserve the ecosystem based on the principle of commensalism. This approach benefits scavengers and decomposers. Additionally, it improves the nutrient cycle flow in the soil. These suggested measures would naturally benefit the forest and lead to the conservation of vulnerable species that depend on carcasses.

## 5. Comprehensive guidelines for wild animal carcass management

**a) Detection and recording of wild animal carcasses:** The carcasses of all scheduled wild animals, when detected, must be recorded in the prescribed format (**Part I of Annexure 1**), irrespective of their location. Intimation (**Part I of Annexure I**) must then be passed on to the Division office/appropriate senior authority through electronic means. The decision/recommendation on the nature of action regarding the post-mortem of the wild animal carcass is included in Part I. Final action, however, will be based on instructions from the appropriate senior authority.

**b) Location of carcass/discovery Site:** If wild animal carcasses are recorded in National Parks, Wildlife Sanctuaries, Reserved Forests, Conservation Reserves, Community Reserves, the carcasses are generally to be left undisturbed unless certain circumstances/guidelines warrant intervention. In the case of predation (**killed by a Tiger/Leopard/Dhole, etc.**), the carcass should strictly not be disturbed or moved. Unnecessary site contamination or public disclosure should be avoided, and the carcass should be left undisturbed.

**c) Decision on post-mortem:** In case of tiger, leopard and elephant carcasses, post-mortem is mandatory. Cases of unnatural death of all wild animals (**due to reasons like accident, electrocution, severe infectious diseases, etc.**) or suspected poaching will require further investigation and intervention, such as a post-mortem.

After the decision is taken on whether the post-mortem is to be conducted or not, further action for the disposal of the carcass shall be taken as per these guidelines. The data during and upon completion of the envisaged action shall be filled in **Part II of Annexure I**. The filled **Annexure I** will have to be stored/preserved and also submitted to the appropriate senior authority.

**a) Post-mortem procedure:** If existing guidelines, instructions, or the situation warrant a post-mortem (necropsy), only then is the post-mortem exercise to be conducted by the Veterinarian (post-mortem team).

- i. If a post-mortem or investigation is to be conducted on the wild animal carcass, the area surrounding it should be secured with tape to preserve evidence.
- ii. All possible evidence is to be collected at the site before the post-mortem is initiated.
- iii. Forest Guards and wildlife watchers will have to be alert at the site to spot the presence/approach of wild animals and prevent any mishap.
- iv. Pouring disinfectants and other chemicals on the carcass during post-mortem is to be avoided at all costs. Care must be taken to ensure that post-mortem equipment and other medical waste, as well as plastic consumables, are not left at the site and disposed of in accordance with the medical waste disposal protocol.

v. The entire process must be thoroughly documented through video and/or photograph recordings, from discovering the dead animal to the final procedure.

vi. The guidelines on the collection, preservation and transportation of biological samples prescribed by the Advanced Institute for Wildlife Conservation, provided as Annexure II, are advised to be followed.

### **Conditions when post-mortem is to be avoided**

In case of suspected **Anthrax**, avoid opening or moving the carcass, as it can release spores and spread contamination. Such carcasses are to be burnt fully and should not be buried under any circumstances. In elephant deaths due to suspected anthrax, no parts of the tusks or tushes should be collected or stored [MoEFCC, 2023].

**a) Carcass after post-mortem in natural habitat:** If the wild animal carcass is in its natural habitat, such as Protected Areas and Reserved Forests, and is considered safe, the remains after the post-mortem should be left undisturbed for scavengers.

i. If the dead wild animal is found to be affected by **communicable** diseases (*eg. herpes, hemorrhagic septicemia, brucellosis, tuberculosis, salmonellosis, chronic wasting disease (CWD), leptospirosis and Ebola virus*) or suspected poisoning, it should be transported to a safe place devoid of humans and other domestic or wild species. The carcass must be incinerated or buried in accordance with the SOPs outlined by the MoEFCC (2023) and the NTCA (2013).

ii. In case of tiger and leopard carcasses, the NTCA (2013) SOP must be followed for disposal. For elephants, the tusks or tushes, if present, must be removed before disposing of the carcass as per the SOP (MoEFCC, 2023).

**b) Carcass found in human-dominated area:** If the wild animal carcass is found in human dominated/residential area and its decomposition at that site is considered not appropriate (*eg. Creation of unhygienic conditions, lack of protection of the carcass or attraction of the wild scavengers to the location*), the remains of the carcass should be shifted to a nearby/appropriate Protected Area or Reserved Forest.

**c) Site selection for shifting of carcasses:** When the carcass is to be shifted from a human-dominated area to a natural habitat, the wild animal carcass should be appropriately placed in an open area within its natural habitat to support scavengers and enhance the natural nutrient cycle flow. The location of carcass disposal should be easily accessible, and the authorities in charge should be able to patrol the site to ensure the decomposition process is safe and effective.

**The other factors to be considered are:**

- **Open ground/Less canopy cover:** The place should have more open space and minimal tree canopy. The foliage can be slightly cleared for animal movement if there are dense bushes.
- **Water body:** The carcass should be placed away from animal drinking sources in the forest. If the wild animal carcass is naturally found in or beside an animal drinking water source, a decision to relocate the carcass may be made, considering the critical nature of the water source and the likely impacts of the decaying carcass.
- **Habitat:** The carcass should be ideally transported to a location where scavengers (such as vultures and mammals) can reach the body and allow complete decomposition. Sites with high scavenger activity are ideal.

**a) Deaths in the Rescue centre/Elephant camps:**

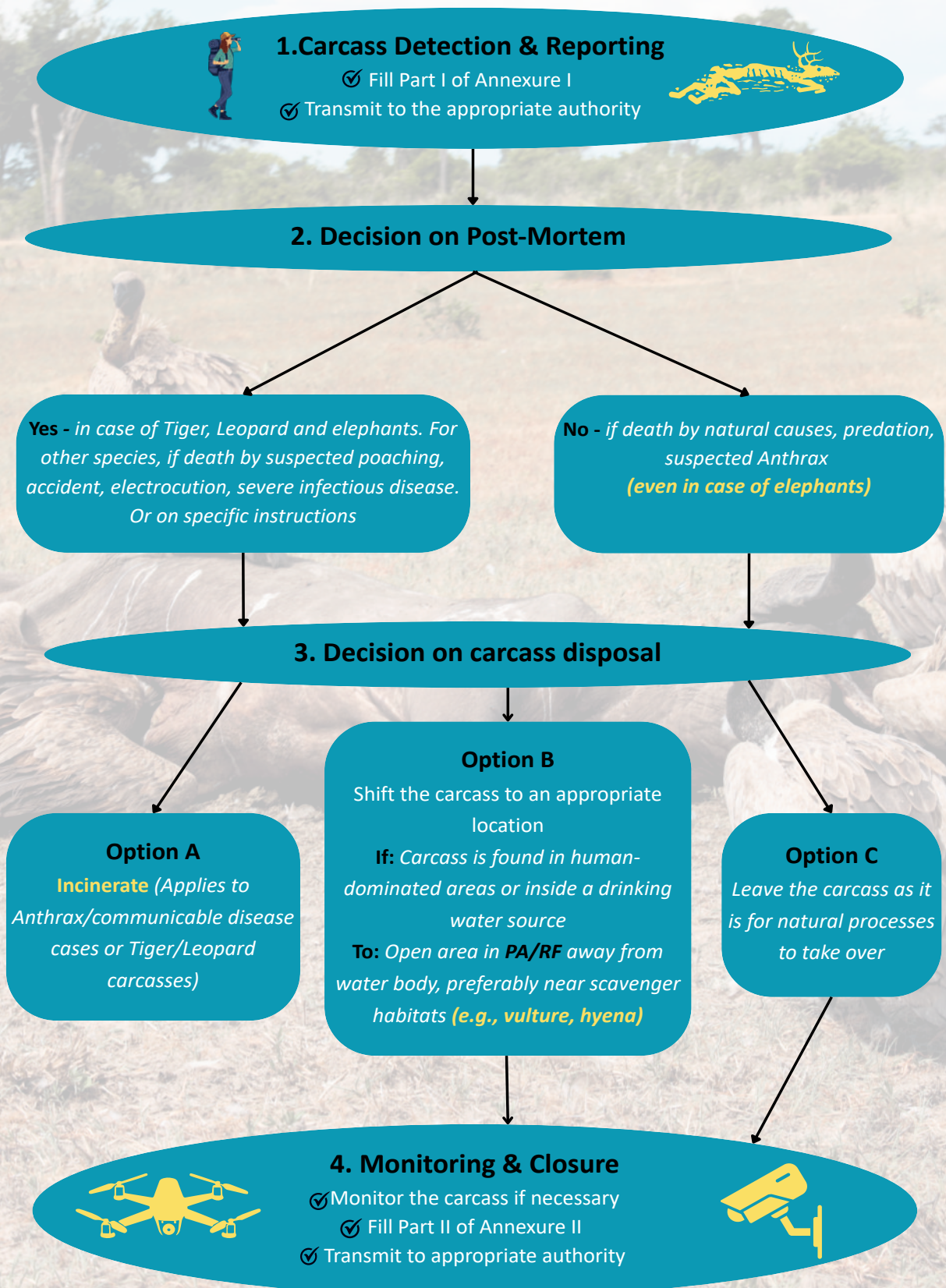
i. For elephants and other large-bodied animals that die in rescue centers or camps, the carcass should be transported to a designated site for detailed necropsy and disposal. Additionally, special care must be taken to disinfect the original site, vehicle, and necropsy area after the carcass has been moved or disposed of to prevent the spread of potential infections (MoEFCC, 2023; NTCA, 2012).

ii. If the dead animal has not been euthanised or tested negative for communicable disease, it should be transported and relocated to a more suitable location for the natural decomposition process.

**b) Monitoring (if necessary) of the carcass decomposition process:** If the factor of illegal removal/pilferage of body parts from the carcass by humans exist, monitoring of the natural process of wild animal carcass disintegration/decomposition will be necessary, and hence the prospect of installing camera traps, CCTV surveillance cameras, drones, and frequent patrolling are to be used to monitor carcasses from threats and track the decomposition process in real-time. The data on the management, disposal and monitoring of the wild animal carcass is filled in Part II of the **Annexure I**

**Important note:**

- It is essential that Part I and Part II of **Annexure I** are properly filled and the document is submitted to the appropriate senior authority.
- **Annexure I** data should be stored/preserved appropriately.
- **Annexure II** provides SOP for collection, preservation and transportation of Biological Samples



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## ANNEXURE I

### DATA COLLECTION SHEET ON DETECTION, ACTION TAKEN, AND MANAGEMENT OF WILD ANIMAL CARCASS

#### PART I

#### PRIMARY DATA

##### I. GENERAL INFORMATION

1. Carcass ID (Division/Range/Beat/No) : .....
2. Date and time of first sighting of carcass:
3. Location- Name:  
Latitude:.....  
Longitude:.....
4. Altitude:
5. Terrain type: Flat / Undulating / Steep
6. Land status of the area where the carcass was found:  
☐ National Park ☐ Sanctuary ☐ Reserved Forest ☐ Other  
If other, Government land /Agricultural land / Private plantation / urban area (Please specify).....
7. Habitat type  
☐ Forest ☐ Grassland ☐ Wetland ☐ In waterbody ☐ Other .....

##### II. DETAILS OF THE CARCASS

1. Species:
2. Approximate age/class: Juvenile / Sub-adult / Adult / Unknown
3. Sex: Male / Female / Unknown
4. Body Condition Score (BCS)  
☐ Emaciated/poor (All bone outlines visible, minimal muscle/fat)  
☐ Thin/moderate (ribs and all bony prominences visible, moderate muscle)  
☐ Healthy (healthy appearance, visible muscle mass)  
☐ Obese (rounded appearance, ample fat, well-nourished)

##### III. CONDITION OF THE CARCASS

1. Estimated time since death  
☐ < 6 hours ☐ 6 – 24 hours ☐ 1 -3 days ☐ > 3 days

## 2. Decomposition Stage

- ☐ Fresh ☐ Early decomposition  
☐ Advanced decomposition ☐ Skeletal remains

### 1. Carcass Position

- ☐ Lying on side/lateral (left/right) ☐ Upright /Dorso ventral  
☐ Prone ☐ Other .....

### 2. Visible injuries, trauma, or signs of scavenging

- ☐ None ☐ Wounds ☐ Fractures ☐ Missing parts ☐ Others

### 3. Probable cause of death (suspected)

- ☐ Natural causes ☐ Vehicle collision ☐ Poaching ☐ Electrocution  
☐ Predation ☐ Disease ☐ Poisoning ☐ Not known

**Additional remarks:**.....  
.....

## IV. PROPOSED ACTION:

### Post mortem

#### ☐ YES

Reason for recommending post-mortem:

- ☐ Tiger, leopard, Elephant ☐ Unnatural death, ☐ Serious infectious disease, ☐ Poaching, ☐ Other  
(please specify)

.....  
.....

#### ☐ NO

Reason for not recommending a post-mortem

- ☐ Predation, ☐ Natural death (eg, Old age), ☐ Anthrax,  
☐ Other (please specify)

.....  
.....

**Additional remarks:**.....

**Signature of Reporting Officer:**

**Name & Designation:**

**Date & Time:**

**Contact Information:**

## PART II

### DATA ON MANAGEMENT, DISPOSAL AND MONITORING OF CARCASS

**Carcass ID (Division/Range/Beat/No):**.....

**i. Action taken:**

- ☐ Post-mortem conducted  
☐ Post-mortem not conducted

If a Post-mortem is done:

**Name and designation of the Veterinary Doctor:**

**Date:**

**Time:**

**Samples collected:** YES / NO

**Location of Post-mortem:** At site, Veterinary hospital, other premises

.....

- ☐ Carcass destroyed by burying/incineration  
☐ Left in-situ for scavenging  
☐ Translocated to a suitable site to aid scavenging

**Translocation site Name:**

**Latitude:**.....

**Longitude:**.....

**Date of carcass disposal:**

**ii. Details of the officers involved in the disposal:**

**iii. Data collection format for monitoring the wild animal carcasses**

**Start date of monitoring:**

| S.No | Date of Observation/<br>photo capture | Time of Observation/<br>photo capture | Scavenger Species<br>seen | Approximate<br>Number | Remarks |
|------|---------------------------------------|---------------------------------------|---------------------------|-----------------------|---------|
|      |                                       |                                       |                           |                       |         |
|      |                                       |                                       |                           |                       |         |
|      |                                       |                                       |                           |                       |         |

**End date of monitoring / near complete decomposition of the carcass:**

**Abstract of scavenger species recorded (tick all that apply):**

- ☐ Jackal ☐ Jungle Cat ☐ Leopard ☐ Tiger ☐ Hyena ☐ Vulture ☐ Wild pig  
☐ Mongoose ☐ Crow ☐ Wild Dog ☐ Other: .....

**Mention the species in case of vultures, mongooses etc.:**

.....

**Signature of Reporting Officer:**

**Name & Designation:**

**Date & Time:**

**Contact Information:**

## ANNEXURE II

### Advanced Institute for Wildlife Conservation

#### Collection, Preservation and Transportation of Biological Samples Standard Operating Procedure (SOP)

**Note:** It is advisable to wear Personal Protective Equipment (PPE) for any sample collection

### 1. BLOOD

**Description of Specimen:** Blood can be satisfactorily collected only from very fresh carcasses (within 1-2 hours after death) and is to be drawn in the presence of a veterinarian

#### Requirements:

1. Sterile gloves
2. Scalpel and blades
3. Hand sanitizers
4. Disposable syringes
5. Ice-box
6. K3EDTA-coated vials
7. Indelible marker pen for labelling

#### Methods of collection:

- A trained technician/phlebotomist should collect the blood
- Blood draining from natural orifices (nostrils, anus, etc) or fresh injuries can be directly collected in sample containers with anticoagulant
- The jugular vein or major vessels may be exposed using a scalpel blade, and attempts may be made to draw blood
- Transfer blood immediately to a K3EDTA-coated vial
- Label the vial with the animal's name, age, sex, date, and location
- Store the vial in an icebox until refrigeration
- Storage and Transport: Store at 4°C in a compartmentalized container to maintain the cold chain during transport to the laboratory

### 2. BLOOD-STAINED MATERIALS

**Description of Specimen:** Blood-stained material (e.g., soil, plant parts, clothes, knife, or axe)

**Requirements:**

1. Sterile gloves
2. Hand sanitizers
3. Dry/Wet swabs
4. Ice-box
5. Zip lock pouches
6. Marker for labelling
7. Plastic vial (for soil or scrapings)
8. Face mask

**Methods of Collection:**

- **Soil:** Scoop using gloved hand or a sterile ladle and place in a dry plastic container
- **Plant parts/Cloth:** Wrap in clean zip lock pouches and staple
- **Knife/Axe:** Secure the entire object in an appropriately sized sterile clean bag and seal
- **Swabbing:** Moisten swabs with distilled water and gently absorb the stains
- **Storage and Transport:** Store tubes or swabs at 4°C in an icebox

**Precautions:**

- Always wear gloves
- Avoid vigorous scraping to prevent sample damage

### 3. MEAT

**Description of specimen:** Cooked, partially cooked, or raw meat

**Requirements:**

- Sterile blade
- Hand sanitizers
- Sample container
- Ice-box
- Zip lock pouch
- Marker for labelling

**Method of collection:**

- Slice an appropriate size of meat (depending on the investigation) using a sterilized blade
- Place in a clean, sterile plastic container and refrigerate. Ethanol (about 10 times the volume) can be used as a preservative for molecular studies

**Storage and Transport:**

- Store in icebox (short term) or refrigerator at 4°C (long term)

**Precautions:**

- Gloves must be worn

- Use separate blades for each carcass/specimen. Sterilize the blade with alcohol before and after use

#### 4. SKIN

**Description of specimen:** Skin from animal carcass

**Requirements:**

1. Sterile scissors or blade
2. Zip lock/sample container
3. Marker for labelling
4. Ice-box
5. Ethanol

**Methods of collection:**

- Sterilize cutting tools with alcohol
- Cut ~5 x 5 cm square piece of skin sample
- Place in a clean, dry container or zip lock pouch

**Storage and transport:**

- Ideally in an ice-box or refrigerator until processing

**Precautions:**

- Use sterilized equipment
- Wear gloves to avoid contamination

#### 5. HORN / IVORY / BONE

**Description of specimen:** Ivory, charred bone, horn pieces, or bones with soft tissue

**Requirements:**

1. Driller/Filer
2. Zip lock pouch
3. Marker for labelling
4. Ethanol

**Methods of collection:**

- Clean the surface of the specimen with absolute alcohol
- Use sterilized filer to obtain small shavings or pieces
- Store in a Petri dish or a zip lock

**Storage and transport:**

- Store wrapped in paper, cloth, or aluminium foil at room temperature
- If soft tissue is present, store at 4°C

**Precautions:**

- Clean filer with alcohol before use

- Use a new filer for each specimen. Alternatively, singe the filer by dousing it in ethanol and flaming it between samples
- Wear gloves to prevent contamination

## **6. HAIR / FEATHERS**

**Description of Specimen:** Animal hair or bird feathers.

**Requirements:**

1. Forceps
2. Zip lock pouch / Petri dish
3. Marker for labelling
4. Ethanol

**Methods of Collection:**

- Pluck (do not cut) hairs/feathers, ideally from multiple representative locations (back, belly, neck, etc.), ensuring root/calamus is intact
- Transfer to a clean, dry pouch and label

Storage and Transport:

- No refrigeration needed; store in a dry labelled box

Precautions:

- DNA is in the root — do not cut
- Use forceps and avoid bare-hand contact.

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### Animals Feeding on Carrion: A Visual Documentation



Leopard (*Panthera pardus*) feeding on a gaur (*Bos gaurus*) carcass at Valparai, Anamalai Tiger Reserve, Tamil Nadu, India.



Striped hyena (*Hyaena hyaena*) and leopard (*Panthera pardus*) feeding on a Sambar deer (*Rusa unicolor*) carcass at Jhalana Reserve Forest, Rajasthan, India.



Stripe-necked mongoose (*Urva vitticollis*) feeding on carcass of a gaur (*Bos gaurus*), at Valparai, Anamalai Tiger Reserve, India.



Leopards scavenging on an Asian elephant (*Elephas maximus*) carcass at Valparai, Anamalai Tiger Reserve, Tamil Nadu, India.



Tigers scavenging on an Asian elephant carcass at Segur Range, Mudumalai Tiger Reserve, Tamil Nadu, India.



Vultures scavenging on Wild dog (*Cuon alpinus*) carcass at Segur Range, Mudumalai Tiger Reserve, Tamil Nadu, India.

**Tamil Nadu Forest Department  
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***Contact us***

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**“To restore stability to our planet, therefore, we must restore its biodiversity, the very thing we have removed. It is the only way out of this crisis that we ourselves have created. We must rewild the world!”**

**- Sir David Attenborough**

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