

# **Natural Resources Conservation and Development**

## **Level-II**

**Based on March 2022, Version1 Occupational standard**



**Module Title: - Applying Sustainable Wildlife Conservation  
and Development**

**LG Code: AGR NRC2M07 LO (1-6) LG (30-35)**

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## Introduction to the Module

This module covers the knowledge, skills and attitude required to recognize protected areas and non-protected wildlife management activities, maintain wildlife habitats to conserve endangered, threatened, and endemic species. It is one of the essential roles of wildlife, which is more difficult and vague to understand and accept for majority of people. Therefore, particularly those of us who trainee and work in the field of wild life conservation and management should be in forefront to change this misconception of the word and work to change people attitude towards proper care for wild life

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## LG #30 LO #1- Identify and Recognize Wild Species

### Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Locating and identifying resources and equipment
- Available processes for wild animals
- Wild animals behavior and home range
- Recognizing and naming specified animals with identifiable characteristics
- Recording and documenting wild animal habits, characteristics and significant features
- Conducting, handling, transporting, and housing wild animals

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Locate and identify resources and equipment
- Available processes for wild animals
- Wild animals behavior and home range
- Recognize and name specified animals with identifiable characteristics
- Record and document wild animal habits, characteristics and significant features
- Conduct, handle, transport, and house wild animals

### Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below.
- Read the information written in the information Sheets
- Accomplish the Self-checks
- Perform Operation Sheets

- Do the “LAP test”

## Information Sheet 1

### 1.1 Locate and Identify Resources and Equipment

#### Introduction

- The term **wildlife** refers to animals and plants that live and grow in nature, outside the direct control of man.
- Wildlife includes mammals, birds, fishes’ reptiles, amphibians, insects and other lower animals such as invertebrates.
- Most of the time people associate the term wildlife only with big animals but it also includes smaller animals and plants growing in natural conditions.
- **Wildlife** traditionally refers to undomesticated animal species, but has come to include all organisms that grow or live wild in an area without being introduced by humans.
- Wildlife can be found in all ecosystems.
- Deserts, forests, rainforests, plains, grasslands, and other areas, including the most developed urban areas, all have distinct forms of wildlife.
- **Wildlife management** is the art of making decisions and taking actions to manipulate the structure, dynamics, and relations of populations, habitats, and people to achieve desired goals.

**The goals may be one or more of the following:**

- To increase the population size - of both plants & animals.
- To remove / harvest individuals from the population on sustainable basis
- To stabilize or reduce the population - if happen to be beyond the carrying capacity

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## Equipment and resource to be provide wildlife

### Wildlife conservation required the following equipment's:

- Computer, software
- Stationary, brochures, booklets and pamphlets, field books
- Cable and its accessories for internet networking
- TV, radio, internet
- Binoculars, GPS, maps
- Mountain bicycle

### Field bags and tents, sleeping bag, sponge mattress

- Digital camera
- Abattoirs
- Knife, scissors
- Dart gun
- Musk collection dish
- Mesh wire, nails, barbed wire
- Hammer
- Measuring tape
- First Aid

### Other resources may include

- Human, financial, physical (traps, firearms, ammunition, poisons, fencing materials)
- Land, air and water transport facilities and
- Plant (excavators, front-end loaders), and plant materials

Identify, select and prepare available processes for wild animal's recognition

Processes available for aid in the recognition of wild animals may include,

- Literature searches

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- internet browsing
- personal consultation with experts
- specimen collections
- field guides
- work place notes, and
- use of simple keys

## 1. 2 Identify wild animals according to their behavior and home range

- **Identify wild based on animal's behavior**
  - ✓ **Wild animal's behavior** is all observable or otherwise measurable muscular or secretory response in response to change in animal external and internal environment
  - ✓ **Ethology:** the scientific study of the nature of behavior and its ecological and evolutionary significance in its natural setting
- **Types of animal's behavior**
  - ✓ Foraging behavior: feeding, locating, obtaining and consuming of food
  - ✓ Parental care behavior: ensuring the survival of young (Caring, nourishing and holding)
  - ✓ Courtship behavior: attracting a mate.
  - ✓ Reproductive behavior: mating and give birth.
  - ✓ Offensive/defensive behavior: aggression or submission (hiding, fighting, escaping and threatening)
  - ✓ Territorial behavior: protect the resource for exclusive use.
  - ✓ Social behavior: work to create alliances, help the group. Grooming, babysitting, defense of young, playing and play fight.
  - ✓ Communication behavior: signals between one animal and others animals
  - ✓ Resting behavior: apparent in action (sleeping, sitting lying down etc.)
  - ✓ Innate behavior: refers to inherited or instinctive or controlled primarily by genes (not learned)

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- ✓ Learned behavior: influenced primarily by environment or experience at sensitive stage of development e.g. language learning in song bird
- ✓ Reproductive behavior: mating and give birth
- **Sex ratio animals:** Sex ratio refers to the population of male and female animals in the population
  - So the population of some wild animal's species is monogamous and some are polygamous
  - A sex ratio of equal male and female is advisable for monogamous species and a ratio of 25:75 is recommended for a polygamous species
  - **Monogamous: equal ration** of male and female maximum production and young age 50:50
  - **Polygamous:** unequal ration of male and female -----25:75
    - ✓ **Polyandry:** many males to one female (75:25)
    - ✓ **Polygyny :** one male t many females (25:75)

### Identify wild animal based on home range

This area in which an individual animal spends all, or most of, its time is known as its **home range**. Much of the activity of animals will center on some favored feeding ground, ora place where it rests or sleeps or perhaps a patch of cover in which it feels secure from enemies. This area, its center of activity (feeding grounds, resting places, and escape) may be quite small; around it will be a somewhat larger area that is visited occasionally.

There are advantages, having home rage, in spending as little energy as possible in search of food and in knowing just where to hide if a predator appears, or in having a familiar place to avoid extremes of weather or insect attacks.

### Generally:

- Sedentary animals may have only one home range
- Some species normally have several home ranges that are used seasonally
- Seasonally used home ranges do not fulfill year round habitat requirements only fulfills seasonal habitat requirements.

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## The difference between Territory and Home Range

### Territories

A **territory**: is an area of land that is actively defended against animals of the same species or against animals of the same species and gender. For example

- Lions will defend their prides territory against other lion prides, and especially against other male lions.
- Leopards on the other hand will defend their territory against other leopards of the same gender, males against males, and females against females.
- Territories are usually marked with urine, rubbing or scratching on trees/vegetation, vocal calls, or dropping
- Most animals have territories for **two main reasons**
  - ✓ To have a secure food and water source and
  - ✓ for the mating rights with the females within the territory
- Territories are more common among predators as well as male animals

### Home Range

A home range is an area of land where animals live which is not actively defended, and animals of the same species move around freely. Home ranges are also usually much larger than a territory. The amount of space an animal uses on a regular basis is called its **home range**. Home ranges can stretch for many miles or they can be only a few feet. The size of a home range often depends on the size of an animal. Large animals, like the moose, need more space to survive than smaller animals. Home ranges are common among general plains game. These animals include zebra, elephant, buffalo, giraffe, and antelope species.

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Some species of animals may have territories as well as home ranges, for example hippo, white rhino, and blue wildebeest males actively defend a territory against other bulls of the same species where the females live in home ranges

### **1.3 Recognize and name specified animals with identifiable characteristics**

- Wild animals Nomenclature means naming of wild animal
- To recognition of wild animals we will be used common names or local name and scientific names required
- In Indigenous communities, language names can be used instead of common names

**Identifiable animal's characteristics may include:**

- The shape, size, color, texture, hair, brief descriptions of habitat and generally behavior of wild animals
- Whether they are move in group or single
- Significant features are recorded in field

### **1.4 Record and document wild animal habits, characteristics and significant features**

**Documentation may include, but not limited to:**

- A written description of the animal species including common and scientific names
- Visible characteristics, and details of the occurrence
- Photographs and reports according to the requirements of the organization sector

**Factors which determining wildlife habitat characteristics**

- Numerous factors of the environment affect wildlife habitat
- These factors vary in time and space and interact in complex ways to favor or hinder the functions of wildlife

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- Habitat means a place where the animal to live; a space where wildlife secures habitat resources and an environment suited to a particular species

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**Ecologists often classify environmental factors as:**

<b>Biotic</b>	<b>Physical</b>	<b>Edaphic (soil)</b>
Food quantity.	Temperature	Depth.
Food quality.	Precipitation.	Moisture.
Predation.	Snow.	Texture.
Disease.	Characteristics.	Chemistry.
	Humidity	

These **physical, biotic and edaphic factors** are determining characteristics of wildlife habitat. The particular range or extent of distribution of a species is determined generally by: Climate, Vegetation and, Topography to which the species can become adapted.

### **1.5 Conduct, handle, transport, and house wild animals**

There are probably five main reasons why you may want to capture or immobilize a wild animal / predator:

- To attach a radio-collar to it;
- To put mark on individuals in some way for various studies;

To take a sample (e.g. of blood, parasites, etc.) from it

- To treat it for injury or disease
- To transport it to somewhere else

## Methods of capture

- If an immobilization is justified, you must then select appropriate method of carrying it out.
- The requirements of any method of immobilization are:
  - ✓ that the risk to the life of the animal should be small;
  - ✓ there should be minimal disturbance or injury to the animal in question and the rest; and
  - ✓ the time and cost of the operation should be as small as possible

## There are basically three main methods of capturing a wild animal:

- A. **Trapping** -mostly traps are placed on an animal trails or at the entrance to burrows.
  - Fixed traps are more suitable for the smaller or more timid species, and at night.
  - Trapping a method to be used when darting is impossible, because it has the further disadvantage of causing some disturbance to the animal and possibly slight injuries.
- B. **Netting or roping** of a free moving animal
  - This method is rarely practicable and advisable for the larger animals with less disturbance and injury to the animals and risk to humans.
  - It is suitable, where possible, for young animals which can be captured quickly and easily by netting from a car.
- C. **Darting** - provides the best method of capturing animals where practicable using Dart guns at reliable ranges.

## Advantages of this method are:

- the operation can be done quickly, quietly, and alone;
- very little disturbance is caused to the animal;
- you can select and capture the particular animal you want; and

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- There are safe drugs suitable for animals which are reasonably cheap and fairly easily available

## Factors to consider during capture

### A. Animal Factors

- **Species of animal** – whether you can physically restrain it or use chemicals, Size/age of the animal
- **Temperament of the animal** - some are more aggressive than others – e.g. for a leopard you have trap before you immobilize,
- **Sex of animal** – especially when using chemical immobilization Use lower dosage in females
- **Number of animals required** – mass vs. individual capture,
- **Animal behavior**– nocturnal vs. daytime activity

### B. Environmental factors

- **Terrain** – choice of required topography,
- **Time of the day** – avoid late in the day,
- **Ambient temperature** – avoid mid-morning and early afternoon

### C. Other factors; Available infrastructure e.g.. Helicopter vs. vehicle vs. foot darting, No. and competency of capture personnel – dictates the approach, Security of personnel – this is “paramount”

## Wildlife welfare regulation

- Handling wild animal without cause of stressing wild animals and disturbance in accordance with **animal welfare regulations**
- **Animal welfare** refers to a utilitarian attitude towards the well-being of nonhuman animals

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- It believes the animals can be exploited if the animal suffering and the costs of use is less than the benefits to humans This attitude is also known simply as **welfarism**
- The Animal Welfare Act 2006 makes owners and keepers responsible for ensuring that the welfare needs of their animals are met

**The animal welfare act 2006 say that the need of animal met include:**

- For a suitable environment (place to live)for a suitable dietto exhibit normal behavior patterns
- To be housed with, or apart from, other animals (if applicable), and
- To be protected from pain, injury, suffering and disease

### **Wildlife Welfare Characteristics**

**Wildlife welfare has two components:**

#### **A. Welfare from a biological view point**

- An animal's welfare state is generally regarded as a consequence of an animal's ability to adapt to environmental challenge.
- Animals adapt by adjusting their behavior or physiology
- Assessing an animal's welfare status is complex and not well understood for all species
- It may require observation of an animal's physiological or behavioral response to the environmental conditions over a period of time.
- This is in order to take account of short intensive periods of environmentalchallenge which may cause stress for the animal at that point but is within the normal ability of the animal to withstand.

#### **B. The animal's welfare state**

- taking account of society's views
- Management decisions need to be based on a well-founded understanding of the biological needs of an animal or group of animals
- They also need to have regard to society's views and values

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### **Handling and transporting wildlife**

- Before carrying out and transporting wildlife, you should satisfy yourself that whether it is worth doing or not.
- Will the information gained be worth the cost of the operation and the risk to the animal's life which attends every immobilization?
- Is your treatment or transportation ecologically justifiable? If an immobilization is justified, you must then select appropriate method of carrying it out
- The requirements of any method of immobilization are: that the risk to the life of the animal should be small; there should be minimal disturbance or injury to the animal in question and the rest; and the time and cost of the operation should be as small as possible

### **Transport wildlife**

- When animals are being transported over long distances, and will be passing from one climatic zone to another, it is important that care should be taken to plan the journey
- Great distress can be caused to animals due to prolonged transited
- Advance preparation should be made for any necessary quarantine measures or other animal health regulations at the ports of intermediate stops or final destination.
- Animal consignments should be collected promptly at their final destination.
- Crated animals should be kept away from direct exposure to the sun and inappropriate temperatures
- Cash on delivery facilities should not be used for animals.
- In order to allow for the use of suitable local materials, no precise specification has been laid down as to the materials from which containers should be constructed.
- The use of expanded polystyrene is recommended for reptiles, amphibians, fishes and invertebrates, as this material has excellent heat insulation properties.
- In order to ensure sufficient rigidity and strength, it is almost always necessary to build containers on a framework

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- Animals that have strong gnawing or clawing habits should be transported in containers
- One of the causes of death in animals during transport is lack of sufficient air, so great attention should be paid to the ventilation of containers.
- On long journeys, many animals should be provided with suitable bedding material

<b>Self-check 1</b>	<b>Written test</b>
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**Name..... ID..... Date.....**

**Directions:** Answer all the questions listed below.

**Test I: Choose the best answer** (each 2 point)

1. \_\_\_ Is refers to animals and plants that live and grow in nature, outside the direct control of man  
A. Domestic      B. wildlife      C. Microorganism      D. All
2. Equipment that used required wildlife conservation  
A. GPS      B. Binocular      C. Camera      D. Compass      E. All
3. The resource that required for wild life conservation are includes  
A. Human      B. Land      C. Finance      D. Water transportation facilities      E. All
4. Carnivorous have larger home ranges than do herbivores of the same body size  
A. True      B. False

**Test II: Short Answer Questions**

1. List down at least four types of animal's behavior (4pts)
2. What is deference between wild life territory and home range? (4pts)
3. What are the two components of wild life welfare? (4pts)

**Note: Satisfactory rating - 20 points**

**Unsatisfactory - below 20 points**

**You can ask you teacher for the copy of the correct answers.**

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## Operation sheet-1

### 1.1 Wild animal identification techniques and their behavior on your area

#### A. Tools and equipment

- Binoculars
- GPS
- Maps
- Digital camera
- Radio
- PPE
- Note book

#### B. Procedures/Steps/Techniques

- Wear personal protective equipment
- Select wild life conservation area
- Identify wild life and their unique characteristics using the wildlife identification techniques
- Record data about identified animal
- Capture photo of targeted animal
- Identify the wild life habitat type, home range, territories and their behavior

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<b>LAP TEST-1</b>	<b>Performance Test</b>
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Name..... ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **3:30** hour. The project is expected from each student to do it.

**Task-1** Perform wild animal identification techniques

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<b>LG #31</b>	<b>LO #2- Establish and Manage Wildlife Conservation Areas</b>
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### Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying protected areas designated for wildlife conservation
- Identifying characteristics of wildlife habitat refugees
- Determining location and boundaries for the wildlife habitat refuge maintenance
- Identifying the time and resources for wildlife habitat maintenance
- Identifying environmental risks and hazards associated with wildlife
- Protecting desirable animal species and maintaining habitat refuges

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify protected areas designated for wildlife conservation
- Identify characteristics of wildlife habitat refugees
- Determine location and boundaries for the wildlife habitat refuge maintenance
- Identify the time and resources for wildlife habitat maintenance
- Identify environmental risks and hazards
- Protect desirable animal species and maintaining habitat refuges

### Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

**Information sheet- 2**

## **2.1 Identify protected areas designated for wildlife conservation**

### **2.1.1 Introduction**

The enlisting of protected areas is the fundamental strategy being used towards the conservation of the world's natural environment and biodiversity

The International Union for the Conservation of Nature (IUCN) has developed the Protected Area Management Categories System to define record and classify the wide variety of specific aims and concerns when categorizing protected areas and their objectives

#### **The International Union for the Conservation of Nature (IUCN) Categories:**

- Strict Nature Reserve
- Wilderness Area
- National Park
- Natural Monument or Feature
- Habitat/Species Management Area
- Protected Landscape/Seascape
- Protected area with sustainable use of natural resources

### **2.1.2 Protected/conservation area of Ethiopia**

#### **A. National Parks**

- Conservation areas which may include terrestrial land or land covered by lake, or other wetlands set aside for the purpose of conserving and protecting wildlife and objects of aesthetic, ecological and scientific interest.
- The following activities are prohibited in the national parks.
- These are hunting, cultivating, grazing livestock, felling trees, burning vegetation, residing in, orexploiting natural resources in any manner, unless these activities are for the development and management of the park.

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**B. Sanctuaries**

- They are set aside to conserve characteristic wildlife communities or to protect a particularly threatened species or habitat
- Prohibited activities in sanctuaries include grazing of cattle, settling, and hunting of animals, unless acting in accordance with the conditions of a permit, or written permission of the general manager or a gamewarden

**C. Wildlife reserves or game reserves**

- These areas are set aside for protecting and propagating wildlife and its habitat; however, it is not as exclusive as a national park
- Persons are prohibited from residing in game reserves without written permission from the authority
- Persons authorized to reside in game reserves have the right to cultivate their land and to pasture and water domestic animals therein
- Prohibited activities include possession of firearms and hunting of animals

**D. Controlled Hunting Areas**

- The controlled hunting areas come under extractive protected areas where areas are managed to protect and utilize wildlife species
- Hunting is allowed to those who have permits from the wildlife authority

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**Table2. 1 Summary of the major protected areas in Ethiopia**

Name	Status ** = Gazetted	Size sq km	Importance
Bale Mountains	NP	2040	Afroalpine, dry montane woodland, moist montane forest: Mt Nyala, Ethiopian wolf.
Simien Mountains	NP **	225	Afroalpine, walia ibex, Ethiopian wolf
Gambella	NP	5061	Swamps, Woodland, lechwe, kob
Omo	NP	4068	Wood-Scrubland, Large ungulate assemblage, Elephant,
Mago	NP	2162	Wood-Scrubland, large ungulate assemblage, Elephant,
Awash	NP **	156	Semi-Arid thorn-bush, oryx, gazelle
Abiatta - Shalla	NP	800	Rift Valley Lakes, avifauna
Yangudi - Rassa	NP	4731	Arid
NechSar	NP	514	Savannah wildlife; Swayne's Hartebeest
Total Area NP	(only 2 Gazetted)	19757	
Alatish	NP planned	2000	Woodland Savannah
Bebille Elephant	WLS	6982	Semi-Arid Elephants
Senkelle Hartebeest	WLS	54	Swayne's Hartebeest
Yebello	WLS	2500	Scrub and Bush Crow
8 x Wildlife Reserve	WR		Many regions
18 x Hunting Areas	CHA		All over, many on
58 x Forest Priority Areas	FPA	13,863	Only those with closed forest

## 2.2 Identify characteristics of wildlife habitat refugees

**Wildlife refuge, also called a wildlife sanctuary, may be**

- a naturally occurring sanctuary, such as an island, that provides protection for species from hunting, predation or competition, or
- It may refer to a protected area, a geographic territory within which wildlife is protected
- Such wildlife refuges are generally officially designated territories, created by government legislation, though the land itself may be publicly or privately owned

**The purposes of a wildlife refuge can include:**

- Recovery of local wildlife species
- Restoration of natural environments
- Study of wildlife and natural environments
- Creating simulated natural environments

**Wildlife habitat**

- Is an area that offers feeding, roosting, breeding, nesting, and refuge areas for a variety of bird and mammal species
- **Habitat** (which is Latin for "it inhabits") is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism.
- It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is utilized by) a species population
- **Generally, wildlife habitat can be categorized under:** terrestrial habitat, marine habitat and wetland Habitat

**Wildlife refuges may contain**

- Remnant native vegetation as well as habitat provided by wildlife corridors
- Windbreaks, woodlots or farm dams
- Numerous factors of the environment affect wildlife habitat

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- These factors vary in time and space and interact in complex ways to favor or hinder the functions of wildlife
- The place to live is what we mean by habitat; a space where wildlife secures habitat resources and an environment suited to a particular species
- These physical, biotic and edaphic factors are determining characteristics of wildlife habitat.
- It is often possible to confuse habitat with ecological niche
- The term habitat is sometimes also confused with the geographical range
- Actually, geographical range is a broader term indicating the map area in which a species occurs

### **Why maintaining wildlife habitat refuges?**

#### **To treat endemic and endangered wildlife resources**

- To create and save wildlife habitat in urban areas, minimizing our adverse impact on local wildlife
- Creating wildlife habitat provides wildlife viewing opportunities for people in cities
- Maintaining a habitat for wildlife in a yard increases biodiversity in the neighborhood
- On a larger scale, how one manages yards and neighborhoods can have a positive effect on surrounding habitat

These natural areas can be connected if residents provide a corridor of natural vegetation through the neighborhood

✓ Essentially, wildlife habitat consists of food, cover, water, and space

### **2.3 Determine location and boundaries for the wildlife habitat refuge maintenance**

#### **Wildlife habitat refuge maintenance may include:**

- Monitoring of vertebrate pest occurrence
- Trapping of pest animals

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- Removal of pest habitats
- Planting of vegetation including re-vegetation of open areas
- Installation of structures including exclusion fencing

## 2.4 Identify the time and resources for wildlife habitat maintenance

- Human resources
- Financial provision
- Physical material including trapping materials, firearms, ammunition, poisons, fencing materials, veterinary products, excavators, front-end loaders, digging material
- Land, water and transportation facility
- Plant materials (seedling, seed etc...)
- Management Tools:
  - ✓ Prescribed fire.
  - ✓ Exotic plant control through mechanical biological and chemical means.
  - ✓ Education/Interpretation.
  - ✓ Law Enforcement.
  - ✓ Partnerships: Division of Forestry, Refuge Friends Group, National Park
  - ✓ Service, Park Service, Fish and Wildlife Conservation Commission.

## 2.5 Identify environmental risks and hazards

### Habitat destruction

- is the process in which natural habitat is rendered functionally unable to support the species present

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**In this process, the organisms which previously used the site are displaced or destroyed, reducing biodiversity**

- Habitat destruction by human activity mainly for the purpose of harvesting natural resources for industry production and urbanization.
- Clearing habitats for agriculture is the principal cause of habitat destruction. Other important causes of habitat destruction include mining, logging, trawling and urban sprawl.
- Habitat destruction is currently ranked as the primary cause of species extinction worldwide.
- It is a process of natural environmental change that may be caused by habitat fragmentation, geological processes, climate change
- The terms "**habitat loss**" and "**habitat reduction**" are also used in a wider sense including loss of habitat from other factors, such as water and noise pollution.

#### **Natural Causes of habitat destruction**

- Habitat loss and destruction can occur both naturally and through anthropogenic causes.
- Events leading to natural habitat loss include climate change, catastrophic events such as volcanic explosions and through the interactions of invasive and non-invasive species.
- Natural climate change, events have previously been the cause of many widespread and large scale losses in habitat.
- Other events in the big five also have their roots in natural causes, such as volcanic explosions and meteor collisions.

#### **Human Impacts of habitat destruction**

- Due to humans' propensity to shape and modify their environment, the habitat of other species often become altered or destroyed as a result of human actions
- Humans were having widespread, catastrophic effects on the environment
- Deforestation, pollution, anthropogenic climate and human settlements have all been driving forces in altering or destroying habitats

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- The destruction of ecosystems such as rainforests has resulted in countless habitats being destroyed
- The forces that cause humans to destroy habitat are known as **drivers** of habitat destruction
- Demographic, economic, sociopolitical, scientific and technological, and cultural drivers all contribute to habitat destruction

#### **Demographic drivers** include

- the expanding human population; rate of population increase over time; spatial distribution of people in a given area (urban versus rural).
- Most of the exponential human population growth worldwide is occurring in or close to biodiversity hotspots.
- The boom in human population and migration of people into such species-rich regions are making conservation efforts not only more urgent but also more likely to conflict with local human interests.
- The high local population density in such areas is directly correlated to the poverty status of the local people, most of whom lack an education and family planning.
- Agricultural intensification will become widespread at the cost of the environment and its inhabitants.
- Species will be pushed out of their habitat either directly by habitat destruction or indirectly by fragmentation, degradation, or pollution.
- Any efforts to protect the world's remaining natural habitat and biodiversity will compete directly with humans' growing demand for natural resources, especially new agricultural lands.

#### **Habitat fragmentation**

- **Habitat fragmentation** as the name implies, describes the emergence of discontinuities (fragmentation) in an organism's preferred environment (habitat), causing population fragmentation.

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- Habitat fragmentation can be caused by geological processes that slowly alter the layout of the physical environment (suspected of being one of the major causes of speciation or by human activity such as land conversion, which can alter the environment much faster and causes extinctions of many species.

**The term habitat fragmentation includes five discrete phenomena:**

- Reduction in the total area of the habitat
- Decrease of the interior : edge ratio
- Isolation of one habitat fragment from other areas of habitat
- Breaking up of one patch of habitat into several smaller patches
- Decrease in the average size of each patch of habitat

**Human causes of habitat fragmentation**

- Is frequently caused by humans when native vegetation is cleared for human activities
- Habitats which were once continuous become divided into separate fragments.
- After intensive clearing, the separate fragments tend to be very small islands isolated from each other by cropland, pasture, pavement, or even barren land.
- The latter is often the result of slash and burn farming in tropical forests

**Some hazards associated with the wildlife resources**

- Disease
- Global Warming
- Habitat Loss
- Invasive Species
- Over exploitation
- Pollutants

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## **2.6 Protect desirable animal species and maintaining habitat refuges**

### **Approach of wildlife habitat refuge maintenance**

- Plantation of food source plants in open areas, creating artificial water holes, salt licks, cover
- Prescribed cutting, burning of vegetation to maintain certain vegetation/succession stage
- Maintaining trails watch tower, hides or cleared look-out point for management purposes
- Maintaining open feeding areas or clearing trail side vegetation to render wildlife more visit able to visitors.
- Enhancing soil (fertilizing and liming)
- Restoring streams
- Creating nest boxes
- Installation of the structures including excluding fencing
- Monitoring pest occurrence, remove pest habitat and trapping pest

### **Manipulation of wildlife population**

- Limit population levels.
- Reduce competition
- Allow for rang extension
- Adjust age and sex ratios
- Treat for diseases.
- Predator control

### **Protecting desirable species from any factors**

- Stopping habitat alteration, which is a primary cause of wildlife extinction
- In practice, this means enforcing conservation laws, renouncing logging concessions, and controlling tree felling
- In certain cases, the habitat may require restoration by artificial means

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- Extending or increasing protection to migration corridors, breeding sites or roosts or nesting sites
- **Developing habitat management:** This includes all forms of manipulation of the vegetation to make it more suitable for the species in question.
- **Actively protecting the endangered species**
  - ✓ This involves improving patrols
  - ✓ controlling illegal hunting and trapping
  - ✓ Adopting special intensive anti-poaching measures.
- Reducing predation of the young by physically excluding potential predators:
- **Head-starting:** This can include artificial hatching of eggs and rearing of young to reduce early mortalities
- Provisioning' providing extra food, water, minerals at salt licks and shelters or by planting favorite food plants
- Controlling or elimination exotic or non-indigenous animals
- Controlling or eliminating feral animals
- Reducing the levels of predators.
- Controlling disease
- Relocation part of a population
- Moved there to avoid the risks of having only one, or a few, populations of a particular species.
- **Restocking** - is very rare by relocating individuals from wild stock elsewhere or releasing captive-bred animals.
- Breeding in captivity, or from seed and sperm banks
- Creating new legislation

#### Relevant legislation and local regulation for wild life habitat maintenance

- Environmental protection
- Threatened species conservation

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- Humane treatment of sick animals
- Apply wildlife habitat modification techniques
- Identification and reporting of suspected outbreaks of exotic disease
- OHS regulations
- Common law principles relating to property, stock, duty of care and due diligence

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Self-check 2	Written test
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Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Test I: Choose the best answer** (2 point each)

- \_\_\_ is the process in which natural habitat is rendered functionally unable to support the species present.
  - Habitat destruction
  - Habitat maintenance
  - Habitat management
  - None
- Habitat loss and destruction can occur due to,
  - Natural causes
  - Anthropogenic causes
  - Human factor
  - All
- Which one of the following is demographic drivers of habitat loss?
  - education status of people in certain areas
  - rate of population increase over time
  - spatial distribution of people in a given area
  - All
- One is not hazards associated with the wildlife resources
  - Disease
  - Global warming
  - Invasive Species

**Test II: Short Answer Questions**

- Mention the purposes of a wildlife refuge (4pts)

**Note: Satisfactory rating - 12 points**

**Unsatisfactory - below 12 points**

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You can ask your teacher for the copy of the correct answers.

<b>LG #32</b>	<b>LO #3- Carry out conservation of endangered and endemic species</b>
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### Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Preparing materials tools and PPE
- Identifying and applying conservation systems
- Record data
- Recording location and times of observations
- Follow OHS requirement.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Prepare materials tools and PPE
- Identify and apply conservation systems
- Record data
- Record location and times of observations
- Follow OHS requirement.

### Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below.
- Read the information written in the information Sheets

- Accomplish the Self-checks
- Perform Operation Sheets
- Do the “LAP test”

### Information sheet 3

## 3.1 Materials tools and PPE

### 3.1.1 Occupational Health Safety

Regular health and safety inspections are an effective tool in the hazard identification process. Together with accident investigation, these inspections form the main thrust in good occupational health and safety management. Not only do they provide an opportunity to identify the sources of potential hazards, but can be used to monitor occupational health and safety policies and procedures and determine how effectively these are translated into the workplace.

#### Essentially, it allows one to:

- Identify hazardous conditions and apply hazard control measures
- Monitor behavior trends
- Monitor and evaluate health and safety standards
- Improve health and safety standards
- Measure performance
- Check new facilities, equipment, processes, etc.
- Collect data for meetings, support of initiatives, etc.
- Maintain interest in health and safety
- Display supervisory commitment to health and safety

#### Physical Hazards

- Animal bites, kicks, or scratches
- Cuts or punctures from fins

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- Capture equipment injuries caused by tools like dart guns or traps
- Ergonomic injuries caused by moving equipment in the field
- Restraint device injuries
- Hypodermic needle sticks
  - Accidental exposure to anesthetic or immobilizing agents
  - Equipment hazards such as rappelling, electrofishing, SCUBA equipment, or fires resulting from rocket-distributed capture nets
  - An effective program design requires input from health and safety specialists and will include the following elements:
    - ✓ Administrative procedures,
    - ✓ Facility design and operation,
    - ✓ Risk assessment,
    - ✓ Exposure control,
    - ✓ Education and training,
    - ✓ Occupational healthcare services,
    - ✓ Personal protective equipment,
    - ✓ Equipment performance,
    - ✓ Emergency procedures, and

### 3.1.2 Suitable personal protective equipment (PPE)

- Hat
- Boots
- Overalls
- Gloves
- Apron
- Water proof clothing
- Spray clothing
- Goggles

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- Respirator or face mask, face guard
- Hearing protection
- Sunscreen lotion and hard hat and

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### 3.1.3 Selecting Materials and tools

Equipment and conservation procedures are tested in field conditions to enterprise and manufacturers'.

Some materials

- Measuring tape -is used measure distance between two points.
- Ranging pole –used to correct slope reading using water level or clinometers.
- Topographic map -is map that used to describe forest areas and forest resource.
- GPS – (Global Positioning System) –is used to gather information of particular area.
- Compass-is used to determine the direction in the forest inventory.
- Use kit bags and helmets: used to put some materials.
- Workplace guidelines – it is used to get some procedures.
- Arial photo - it is used to take the image of different wild animals and other related information from the sky.
- Field note book- is used to record some information.
- Binocular –it is used to see the wild animals which fear full and difficult to or animals that you cannot get on the open areas.
- Video camera – it is used to take the image of different wild animals and other related information.
- Radio-tracking: providesa method where by particular animals can be found wherever they are, whenever you want to find them.

### 3.2 Identify and apply conservation systems for endangered and endemic species

Ethiopia is fortunate in possessing a diverse fauna diversity and significant number of endemic species.

In numerical terms, 22 out of 260 species of mammals, 27 out of 845 species of birds, 3 out of 78 species of reptiles, 17 out of 54 species of amphibians and 4 out of 101 species of fishes are endemic.

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**Conservation** is the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations of people while maintaining its potential to meet the needs and aspirations of future generations. Conservation is thus inclusive term, meaning it includes management, preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment.

**Wildlife conservation** is a practice in which people attempt to protect endangered plant and animal species, along with their habitats. The goal is to ensure that nature will be around for future generations to enjoy, and to recognize the importance of wildlife and wilderness lands to humans

**Endemic species**- any species that are native or restricted in specific area

**Endangered species** - any species that is in danger of extinction throughout all or a significant portion of its range

**Threatened species** - any species that likely to become an endangered species within the foreseeable future throughout all or significant portion of its range

#### **Reasons for conserving / managing wildlife**

- To maintain essential ecological processes and life support systems.
- To preserve genetic diversity
- To ensure the man's sustainable utilization of species and ecosystem.
- Recreational and aesthetic value
- Recreational value
- Educational and scientific values.
- Cultural values of wild life

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## Some common endemic, endangered & endemic species of wild animals in Ethiopia

### Endemic birds of Ethiopia

- White Collared pigeon
- Spot-breasted plover
- Yellow-fronted parrot
- Prince Ruspoil's Turaco
- White-winged cliff chat
- Abyssinia Cat bird
- Yellow-throated seed eater
- White-billed starling
- Ankober Seed-eater
- Black headed Forest oriole
- Thick-billed Raven
- Blue winged Goose
- Harwood's Francolin
- Black-winged love bird

### Some Endemic mammals of Ethiopia

- Ethiopian wolf
- Mountain Nyala
- Walia Ibex
- Blick's Grass Rat
- Gelada Baboon
- Harrington's Grove
- Toothed mouse
- Giant mole rat
- Lopguromys melanonyx
- Wild Ass
- Nikolaus' climbing mouse
- Meneliks Bush-Buck

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- Starck's Hare
- Swayne's Hartebeest
- Patrizii's Bat
- Scott's Hairy Bat
- Kerivoula eriophora
- Morris' Hairy
- Mahomet's mouse
- Bailey's shrew
- White-footed rat
- Muriculus imberbis
- Stenocephalemys griseicauda
- Groove-toothed mouse
- Lovat's

### **Critically endangered:**

- African wild ass (*Equus africanus*)
- Bilen gerbil (*Gerbillus bilensis*)
- Black rhinoceros (*Diceros bicornis*)
- Ethiopian wolf (*Simian jackal/canissimensis*) -endemic to Ethiopia
- Guramba shrew (*Crociduraphaeuura*) -endemic to Ethiopia
- Harena shrew (*Proedura harena*) -endemic to Ethiopia
- MacMillan's shrew (*Crociduramacmillani*) -endemic to Ethiopia
- Walia ibex (*Capra walie*) -endemic to Ethiopia

### **Endangered:**

- Grevy's zebra (*Equus grevyi*)
- Mountain nyala (*Tragelaphus buxtoni*) -endemic to Ethiopia
- Nubian ibex (*Capra nubiana*)

### **Conservation techniques of endangered and endemic species**

#### **Conservation techniques of endangered and endemic species include:**

- Isolation of the entrance of domestic animals
  - ✓ To avoid genetic mixing (mating)

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- ✓ To reduce competition for food, water & space
- ✓ To minimize disease transitions
- Use artificial insemination method
  - ✓ This is to flourish the endangered species back (by taking Male's sperm & get to female's fallopian tube for fertilization to occur)
- Avoid \minimize disturbances
  - ✓ Wild animals are sensitive to their environment so that any disturbances like car noise, sound of gun; torch
- Avoid irregular hunting
- Prevent settlement of peoples at the vicinity of wild animals
- Control reckless destruction of forests
- Keeping the boundaries of wild life sanctuaries free.

### 3.3 Record data

- Records are a vital part of any conservation program, and are particularly important when an individual or an organization is trying to learn from previous work in an effort to improve the care given to wildlife
- Records should be kept on all animal admissions
- Animal admission forms and animal examination forms can be used to ensure that vital information is gathered for each animal
- Daily forms for animals and birds by enclosure or cage are required to verify that food, medications, and care are being provided
- These records must be kept on file by the rehabilitator for future reference, should this be required

### 3.4 Record location and times of observations

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While recording the data regarding conservation we have to record the location and times of observation too. This enables to recognize the characteristics of animal species in time & space. Therefore, it is important to fill the gaps in accordance with the requirements of animals and to prioritize our activities too.

### **Required Information**

The following point should be record in Wildlife resource

- Your Name, Address and Telephone number
- Species name
- Site where the observation was made (location and time)
- Date of Observation
- Numbers of targeted wildlife
- Sex, age and colors
- Behavior of animal; feeding, rearing of young, mating, playing etc.
- Weight and Size of animals
- Habitat type and general condition of wild animal

### **The data records should become:**

- legible: not to be illegal
- accurate: avoid unnecessary or error
- Complete: the recorded information should be full expressing the objectives that sated
- Compile and present wildlife resource data

### **3.5 Follow OHS requirements**

#### **Hazard and sensitive environment risks which may impact on conservation**

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- Wildlife habitat destruction-by poor farming system, extraction of forest. etc.(loss and destruction of vital parts of its habitat)
- Institutional instability –frequent change of institution that governs wildlife conservation and management of it.
- Mismanagement of marginal land
- Poaching(illegal killing of wild animals)
- Financial and trained manpower constraints
- Lack of desired awareness about wildlife and their benefit for general public
- Increase livestock and human population pressure
- Settlement were established in protected area
- Grazing of livestock in parks and sanctuaries’
- Total lack of participation of the communities
- Wild animal were indiscriminately slaughtered
- unusually high mortality (either natural or induced) or low reproduction,
- climatic, geological (e.g. Volcanic eruption) and evolutionary changes
- weakness of wildlife management

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<b>Self-check 3</b>	<b>Written test</b>
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Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

Test I: Choose the best answer (2 point each)

- The techniques of conservation of endangered and endemic species
  - Isolation of the entrance of domestic animals
  - Use artificial insemination method
  - Avoid or minimize disturbances
  - All
- Any species that are native or restricted in specific area
  - Endemic species
  - Endanger species
  - Threated species
  - All
- Any species that likely to become an endangered species within the foreseeable future throughout all or significant portion of its range
  - Wild species
  - Endemic species
  - Threatened species
  - Domestic species

**Test II: Short Answer Questions**

- Write down at least three names of endemic species in Ethiopia(5pts)
- List down at least three critically endangered species (4pts)
- What are the reasons for conserving wildlife? (5pts)
- What we mean by Aesthetic value of wild animal. (2pts)

**Note: Satisfactory rating - 20 points**

**Unsatisfactory - below 20 points**

You can ask you teacher for the copy of the correct answers.

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<b>LG #33</b>	<b>LO #4- Collect and record wildlife resource data</b>
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**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Specifying requirements of the data to be collected
- Identifying wildlife resource data collection methods
- Advising about proposed data collection
- Identifying difficulties of data collection
- Completing legible and accurate records

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Specific requirements of the data to be collected
- Identify wildlife resource data collection methods
- Advice about proposed data collection
- Identify difficulties of data collection
- Complete legible and accurate records

**Learning Instructions:**

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below.
- Read the information written in the information Sheets
- Accomplish the Self-checks
- Perform Operation Sheets
- Do the “LAP test”

## Information sheet 4

### 4.1 Specific requirements of the data to be collected

#### Introduction

Planning for the management of effects on wildlife requires an experienced team of wildlife and impact assessment professionals who understand the regulatory requirements and process, know how and where to access the wildlife information required, and have the expertise to follow the project through completion.

Data collection protocols should be developed and occasional field checks should be carried out to ensure the quality of the data collection. A standardized data collection system or representative system of sampling transects should generate interpretable data for a long-term monitoring system.

**To properly manage a resource you need to know how many or how much of the resource there is.**

- What species are in the area of interest?
- Numbers as close to actual population as possible
- Establish a baseline status for all species present
- Monitor health of populations
- Monitor health of ecosystem
- Overall ecological understanding

#### Data requirements can include:

- Lists of expected species present on site, emphasizing species of conservation concern
- Site specific features (e.g., bear dens, mineral licks, raptor nests)
- Identified habitats of importance (e.g., ungulate winter range, areas of known concentration)
- Documented seasonal habitat use
- Estimates of animal abundance (listed by habitat and season)

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- Historical distributions and habitat use

### **The need for data collection/inventory and monitoring**

A wildlife manager should answer two types of questions about the species in the reserve.

1. What species communities occur within the protected area, where and in what numbers?  
(**inventory**)
  - ✓ Are there reliable estimates of species and population densities?
  - ✓ Particularly target species.
  - ✓ How are they distributed in space and time?

2. What are population trends in space and time? (**monitoring**)

### **Monitoring usually aims at recording three different features of biological resources:**

- Trends in population numbers of key plant and animal species over time, including historical evidence where possible.
- The measurement of reproductive success or productivity of species
- Assessing the quality or condition of species and habitats

### **The amount of wildlife data required generally is proportional**

- To the potential level of disturbance,
- The geographic location of a project, and
- The amount of existing data for that area including known species of conservation concern.

### **Considerations Prior to Census:**

- Size survey area
- Precision & accuracy of method
- Survey design & sample size
- Cost & Time
- Manpower & Logistics

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## **4.2 Wildlife resource data collection methods**

### **Wildlife counting techniques or estimating animal numbers**

To introduce the names of different techniques or methods used in counting wild animals, the following are listed. However, only ground sample counting and indirect methods of counting animals are briefly discussed here

- 1. Aerial sample counts**
  - Aerial transect sampling
  - Aerial quadrat sampling
  - Aerial block sampling
- 2. Ground sample counting from vehicles or on foot**
  - Total counts
  - Transect sample counts
    - ✓ Fixed width method
    - ✓ Variable fixed width method
    - ✓ Fixed visibility profile method
    - ✓ Variable visibility profile method
- 3. Indirect methods of counting animals**
  - Mark -release recapture techniques
  - Pellet / dropping counts
  - Broad casting tape recorded calls

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- Tracks / spoor counting
- Vocalization

### **Direct Methods wildlife count**

#### **A. Aerial sample count**

- It is now a very frequent used method of counting large mammals.
- Particularly aerial transect sampling count is most popular type of sampling method
- The principle is that the aircraft flies in a straight line from one side of the census zone to the other at a fixed height above the ground.
- Streamers are attached to the wing struts of the aircraft so that the observer sees a strip demarcated on the ground.
- The transects are sample units, and the observer counts all the animals that he sees between the streamers
- Use of aerial photographs and satellite images are also used to estimate population density of bigger animals

#### **B. GROUND COUNTING**

- This could be carried out by using vehicle or on foot

#### **1. TOTAL COUNT**

- It requires large number of personnel's, which line up, walk through the area and drive all animals from the area
- It is a method used to count relatively large animals
- Observers must be stationed around the target area to count any animal leaving it
- The applicability of total count methods obviously varies among species and their habitat
- Sometimes the whole area must be searched; every animal must be located and accurately counted

### **The limitations of the method are:**

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- It only possible on smaller area
- Applicable only to observable & larger animals
- It will be difficult for fast moving animals
- Because it is likely to count the same animal twice & the animal aware and disappear before locating them

## **2. Transact sample counts**

- Out of the given whole area, only samples of a given area are used to estimate the total population
- The general procedure here is to count all the individuals on sample area of known size and to extrapolate the average to the whole area

### **An important principle for accuracy / reliability depends on:**

- The greater the number of unit samples, the greater the accuracy of the estimate
- The population of each sample area must be known exactly
- The sample must represent the whole area; this is achieved by random sampling.
- Counting can be done either by use of vehicle or on foot
- The experts needed to distribute many short transact at random locations within the census zone
- The transact should oriented to cut across the major vegetation boundaries

### **The simple formula used to estimate population density is:**

$$O = (K \times S \times 2) \text{ km } 2$$

$$D = N/O$$

$$P = N/O \times H$$

Where: -

O = Observed area (sample area)

K = Length of the transact distance traveled while counting,

S = Sighting distance on both sides of the transact

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D = Density, number of animals counted per km<sup>2</sup>

N= Total number of animals counted on observed area.

H = Size of the whole conservation area on which one wants to estimate population size.

P = Total population size of the whole area or population estimate.

**For foot census three individuals are usually needed**

- One observer
- One pacer
- One recorder

**Indirect methods**

- There are certain situations in which none of the direct methods discussed so far can be applied.
- For example, when the animals are totally, or almost, invisible or when only a proportion of the total animals in an area can be seen at any one time.
- In this case indirect methods of counting have to be used.

**1. Mark Release - Recapture methods**

- The basic theory of mark-release-recapture methods is that a known number of animals from an area is caught and marked in some obvious way.
- The animals are then released.
- A suitable period of time is allowed for the marked animals to mix in the population, before further catches are carried out.
- The total number of animals can then be estimated from the proportion of marked to unmarked animals in the catches.
- The technique involves capture, marking, release and recapture.
- The method not only estimates density but also birth rate and death rate of population.

**Different types of marking**

- Paints

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- Labels (tag)
- Dyes
- Mutilation

**The result obtained using such techniques sometimes become inaccurate because:**

### **1. Pellet counts**

- The theory is that if you know the rate of defecation then you work out from pellet counts the number of animals in an area.

**The main practical problems are: -**

- Knowing the rate of defecation,
- Locating all the piles of pellets, and
- Accurately identifying and aging the pellets

### **2. Broadcasting tape-recorded calls.**

- The idea here is to use a tape recording of a social call to elicit a vocal or visual response from an otherwise silent or invisible animal. E.g. the method is used in east Africa on hyenas. In this case lion feeding noises were broad cast to attract hyenas, and vice-versa.

### **3. Vocalization**

- Example the number of pheasant calls heard per 15 minutes in the early morning has been used as an index of the size of the pheasant population.

## **DATA COLLECTION PROCEDURE**

**Information should be collected using the procedures outlined below:-**

- **Establishing Survey Location:-** When selecting inventory sites, priority should be given to the highest valued resource management areas
- **Conducting the Survey**
  - ✓ **Years:** - survey should continue for many years, depending on the size of the refuge
  - ✓ **Time of Year:-** The survey must be conducted during the growing season
  - ✓ **Time of Day:** - The survey can be conducted anytime during daylight hours

**At a minimum, records should include the following information:**

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- Methods of data capture
- Purpose of survey or data capture
- Geographical extent of survey
- Time span of survey.
- Outline of ways in which data were checked
- External sources of information about the data
- Access and use constraints
- materials, instruments, and software used
- Names and roles of any team members who worked with the data
- identification number(s) to indicate the subject and/or session
- Date and time

#### **4.3 Advice about proposed data collection**

##### **Common Problems encountered in data Collection**

- Studies performed to date have indicated that the upper-air measurement systems described in this document can reliably and routinely provide high quality meteorological data.
- However, these are complicated systems, and like all such systems are subject to sources of interference and other problems that can affect data quality.
- Users should read the instrument manuals to obtain an understanding of potential shortcomings and limitations of these instruments
- If any persistent or recurring problems are experienced, the manufacturer or someone knowledgeable about instrument operations should be consulted

##### **Generally common problems encountered in data collection are:**

- In accuracy of data collection and data analyzing
- Biasness of data (falsify the data collected)
- Sampling error
- Uncertainties in collection mechanism.

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- Uncertainties collection mechanism may produce unrealistic information.

**The difficulties reporting procedure is designed to,**

- Identify potential hazards to the health and safety of workers
- Encourage early reporting and corrective actions
- Reduce the number of incidents arising from work activities
- Enable senior management to identify areas concern
- To identify the steps to be taken for reporting difficulties conditions that may arise in the workplace

#### **4.4 Identify difficulties of data collection**

**Generally Common Problems Encountered in Data Collection is:**

- In accuracy of data collection and data analyzing
- Biasness of data (falsify the data collected )
- Sampling error
- Uncertainties in collection mechanism. Uncertaintiescollection mechanism may produce unrealistic information

#### **4.5 Complete legible and accurate records**

The concept of **record** is variously defines as "information created, received, and maintained as evidence and as an asset by an organization or person, in pursuit of legal obligations or in the transaction of business"key feature of **records** is their ability to serve as evidence of an event. Proper records management can help preserve this feature of records

**A record** is a document consciously retained as evidence of an action. Many systems, especially forelectronic records, require documents to be formally declared as a record so they can be managed. Records may be covered by access controls to regulate who can access them and under what circumstances

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Physical controls may be used to keep confidential records secure – personnel files, for instance, which hold sensitive personal data, may be held in a locked cabinet with a control log to track access.

By keeping detailed field notes you will always have access to your earlier research ideas and observations and you can use them at any time, now or in the future.

**The data records should become:**

- legible: not to be illegible
- accurate: avoid unnecessary or error
- Complete: the recorded information should be full expressing the objectives that sated
- Compile and present wildlife resource data

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<b>Self-check 4</b>	<b>Written test</b>
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**Name..... ID..... Date.....**

**Directions:** Answer all the questions listed below.

**Test I: Choose the best answer** (1 point each)

- The limitations of the total counting method is
  - It only possible on smaller area
  - Applicable only to observable & larger animals
  - It will be difficult for fast moving animals
  - All
- Count all the individuals wildlife on sample area of known size and to extrapolate the average to the whole area
  - Transect sample count
  - Ground count
  - Total count
  - Vehicle count
- The wildlife data records should become
  - Legible
  - Illegal
  - Accurate
  - A & B
  - A & C

**Test II: Short Answer Questions**

- Write down the direct and in direct methods of wild life data collection?(10pts)
- List materials & tools that required collecting wildlife data?(5)
- List down common problems encountered in wildlife data collection? (5pts)

**Note: Satisfactory rating - 26 points**

**Unsatisfactory - below 26 points**

You can ask you teacher for the copy of the correct answers.

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## Operation sheet-4

### 4.1 Collect and record the wildlife resource data(inventory)

#### A. Materials, tools and equipment

- Cameras
- video recorders
- binoculars
- GPS
- Maps
- Field guides
- PPE
- Note books
- Pencil

#### B. Procedures/Steps/Techniques

1. Prepare necessary materials and equipment
2. Select and observe site of wildlife conservation area
3. Select the appropriate methods of recording and counting wildlife
4. Undertake inventory
5. The inventory includes identification of the name, age, sex, colour, feeding and playing target wildlife animal you need to record data
6. Refer with guide book to be sure about the species
7. Then do next activities through order of scheduled activity
8. Check the information if they are on the correct format
9. Submit for your instructor to be reviewed.

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<b>LAP TEST-4</b>	<b>Performance Test</b>
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Name..... ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **3:45** hour. The project is expected from each student to do it.

**Task-1 Collect and record the wildlife resource data (inventory)**

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<b>LG #34</b>	<b>LO#5-Utilize Consumptive and Non Consumptive Wildlife</b>
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### Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Following OHS requirements
- Understanding ways of consumptive wildlife utilization
- Identifying and using relevant sources of information
- Identifying and applying rules and regulations
- Implementing needs of customers' wildlife hunting
- Applying ways of non-consumptive wildlife utilization
- Conducting civet musk collection, tourism, and photography

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Follow OHS requirements
- Understand ways of consumptive wildlife utilization
- Identify and use relevant sources of information
- Identify and apply rules and regulations
- Implement needs of customers' wildlife hunting
- Apply ways of non-consumptive wildlife utilization
- Conduct civet musk collection, tourism, and photography

### Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below.

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- Read the information written in the information Sheets
- Accomplish the Self-checks
- Perform Operation Sheets
- Do the “LAP test”

## Information sheet-5

### 5.1 Following OHS requirements

**Hazard:** Anything (e.g. condition, situation, practice, behavior) that has the potential to cause harm, including injury, disease, death, environmental or property and equipment damage

**Hazard Identification:** This is the process of examining each work area and work task for the purpose of identifying all the hazards which are “inherent in the job”. Work areas include but are not limited to machine workshops, laboratories, office areas, agricultural and horticultural environments, stores and transport, maintenance and grounds, reprographics, and lecture theatres and teaching spaces.

**Risk:** The likelihood or probability that a hazardous event (with a given outcome or consequence) will occur

**Risk Assessment:** Is defined as the process of assessing the risks associated with each of the hazards identified so that appropriate control measures can be implemented based on the probability, ie. Likelihood that harm, injury or ill health may occur and how severe the consequences of exposure might be.

**Risk Control:** This is the process of identifying and implementing the most cost effective risk control measures having regard to the Hierarchy of Control Principle, legislative provisions, Australian Standards and other relevant information.

**PPE** is defined in the Regulations as ‘all equipment (including clothing affording protection against the weather) which is intended to be work or held by a person at work and which protects him against one or

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more risks to his health or safety.eg. Safety helmets, fire gloves, glove, eye protection, high visibility clothing, safety footwear, ear protection (ear muffle), sun screen lotion and safety harnesses

### **5.1.1 Occupational Health and Safety in Wildlife workers**

Wildlife biologists, technicians, and veterinarians complete their tasks safely and uneventfully every day. However, some significant risks exist in this line of work, and injuries, illnesses, and accidental deaths among wildlife workers do occur.

- Aviation accidents (airplane and helicopter)
- drowning,
- And car and truck accidents are the most common causes of fatalities among wildlife workers.
- Although rare, serious zoonotic infections also happen.

#### **Potential Risks**

##### **A. Physical**

- Employees working outdoors are exposed to many types of physical hazards depending on the type of work, geographic region, season, and duration of time spent outside.
- In addition, man-made hazards such as electrical overhangs, utilities, canals, and various types of infrastructure, should be identified and assessed prior to work.

##### **1. Injury (due to animals or equipment)**

- Wild animals can inflict injury on humans unintentionally or as an act of aggression or defense
- While mammalian predators and venomous reptiles are often thought of as dangerous, most wildlife can injure humans through biting, kicking, scratching, stomping, or crushing
- An understanding of animal behavior is essential for safely handling wildlife
- In addition to hazards associated with direct animal handling, much of the equipment, if improperly used, can be dangerous to humans.
- Traditional firearms, remote delivery systems (i.e., dart guns), traps, and snares can cause trauma to humans

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- Knives, needles, and other sharp tools can also cause injury. Use of aircraft for animal capture and monitoring poses an additional risk

## 2. Injury (due to environment)

Although the allure of working outdoors attracts many people to the NPS, there are unique hazards employees encounter when working outdoors. The basic hazards that need consideration when working outside are:

- Exposure to:
  - ✓ Heat Stress
  - ✓ Cold Stress
  - ✓ Dehydration
  - ✓ UV Radiation (Sun)
  - ✓ Lightning
  - ✓ Wind (falling trees/limbs)
- Topography
  - ✓ Elevation
  - ✓ Water hazards
 

**Environmental chemical hazards** may be either naturally occurring or may be intentionally applied (e.g., pesticides, herbicides), or could be accidentally spilled (e.g., gasoline, oil). Exposure to these substances from dermal contact (either direct or indirect) or inhalation may result when working in contaminated environments
- **Biological**
  - ✓ There are a variety of biological hazards associated with handling wildlife.
  - ✓ Some of the most common are exposure to venomous animals (e.g., snakes) and hypersensitivity type allergic reactions due

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to contact with any plant or animal a person is responsive to (e.g., bee stings, pollen, poison ivy).

- ✓ While less common and potentially less well understood, transmission of infectious diseases between wildlife and humans also poses an important biological hazard
- ✓ Diseases that are shared between animals and humans are termed zoonotic diseases
- ✓ Zoonotic diseases are generally uncommon; however, the consequences of disease may be high.
- ✓ This can lead to an increase in concern and dread about infection. Transmission of zoonotic diseases requires three elements: an infection source, a susceptible host, and a route of transmission for the pathogen
- ✓ Besides humans, susceptible hosts can include other species or animals of the same species.
- ✓ It is possible for the same pathogen to be transmitted by multiple routes.
- ✓ Contact transmission occurs when pathogens enter the human host by ingestion, mucous membrane contamination, or through breaks in the skin.
- ✓ Direct contact transmission occurs when the pathogen is transferred after handling infected animal or biological samples from an infected animal.
- ✓ Indirect contact transmission may occur by handling contaminated objects, touching contaminated surfaces, or from the environment.
- ✓ Transmission via air occurs when pathogens from animals or their environment travel through the air and are inhaled or deposited on mucous membranes.
- ✓ Pathogens may become aerosolized when an infected animal coughs or sneezes

### **Health Risks Associated with Eco tours**

- Health risks associated with ecotourism are both similar and different to other travel experiences
- Unfortunately, when travellers book a trip, many don't consider the health risks of their destination.

### **Preventive health strategies like**

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- paying attention to food and water safety (avoiding salads, shellfish, and tap water, for example),
- understanding the sources and causes of infection,
- taking preventive medication if needed,
- And physician advice, are often ignored.

### **5.1.2 OHS hazards associated with wild life management**

- Fire flame
- Sharp hand tools and equipment's
- Slippery and uneven(undulating) surfaces
- Solar radiation
- Chemical and hazardous substance
- Incorrect manual handling

#### **Control measures**

- Appropriate use of personnel protective equipment including sun protection and management equipment e.g hats and musk other
- Appropriate use of safety equipment's
- Assessing and reporting risk
- Basic first aid available on site
- Correct manual handling
- Identifying hazards
- Maintaining personal hygiene

#### **Personal protective equipment:**

- Eye protection
- Helmets, hoods, head protection
- Gloves, aprons, sleeves
- Hearing protection waterproof clothing

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- Hat, boots, overalls, gloves, sunscreen lotion and hard hat

#### **General safety rules:**

- Read and follow the safety notices and other information that is posted.
- Observe and follow all safety instructions, signs, and operation procedures.
- Help your fellow employees when they ask for assistance or when needed for their safety.
- Never participate in “horseplay”.
- Horseplay that results in injury is often not covered by Workers’ Compensation.
- Clean up spills immediately
- Report all unsafe conditions, hazards, or equipment immediately
- Make sure other people are warned of the problem so that they may avoid it
- Wear personal protective equipment as required to reduce injury potential
- Use gloves, safety glasses, back support belts, etc., as necessary
- Never stand on chairs, furniture, or anything other than an approved ladder or step stool.

### **5.2 Identify ways of consumptive wildlife utilization**

#### **Consumptive utilization**

- The organism concerned is used up - either killed if animals, or cut down if a plant. Examples are hunting for meat or skin, harvesting or cutting of wild trees, “sport” hunting, and fishing.
- In Ethiopia sustainable utilization and farming of wild life is in its infancy stage; however there has been encouraging attempts:
  - ✓ Ostrich farming - at Abijatta - Shalla lakes National Park
  - ✓ Crocodile ranching - at Arbaminch, close to Nechisar National Park
  - ✓ “Sport” hunting, at different controlled hunting areas
  - ✓ Trophy sales ( ivory, skins of spotted cats & colobus monkey
  - ✓ Live animal export (monkeys, baboons and birds)

The development of commercial breeding of wild life species (through rearing and farming methods) can help take utilization pressure off wild life population, and can even prove a benefit to them.

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**However, the following points should be considered for controlled trade:**

- Develop a system whereby there is a net gain to wild life population
- In exchange for permit to remove from the wild either breeding stock or eggs and young for captive rearing projects, the farming/ rearing agency must agree to make available for release in to the wild an agreed number of animals or percentage of reared stock
- Link farming and utilization closely to adequate protection of wild population
- Development a control system that makes it difficult for wild stock to be poached and traded as farmed or domestic animals
- Methods can include application of upper size limits and supervised marketing of captive stock
- This is particularly important for species listed under the convention for the international trade as endangered species of fauna and flora

### **5.3 Applying ways of non-consumptive wildlife utilization**

#### **1. Indirect values**

**Non Consumptive utilization:** The organism is available again and again to generate income, or its products are harvested without killing it. In Ethiopia there are examples with regard to this form of utilization

- Tourism and recreation - tourist viewing of wildlife and scenery.
- Civet must collection- from individually reared animals.
- Game viewing and photographing
- Wild coffee collection- from natural forest.
- Incense and gums collection- from arid and semi-arid parts of Ethiopia
- Mountain trekking and hiking

#### **2. Recreational value**

- People derive benefits of pleasure, adventure, and enhanced physical and mental health from outdoor activities involving the pursuit or sometimes-accidental enjoyment of wild life

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- People can recreate by hunting, fishing, bird watching, photographing, hiking, camping and by other wildlife based outdoor activities
- Ethiopia has many places, conservation areas (parks, controlled hunting areas, sanctuaries and game reserves), natural forests and mountains which have recreational values and benefits
- The value people receive is usually measured by their willingness to pay for the outdoor recreation, to the extent that wild life is wholly

### **3. Aesthetic value**

- It is the most personal and variously conceived value of wild life
- Everyone appreciates the sight of a lion, leopard, colorful birds, beautiful mountain scenery, songs of ducks
- This is beautiful that meets the eye and ear, and our response to it seems innate
- Aesthetic values of wild life are usually impossible to quantify
- They are values that stir the emotions and they are often the first value that attracts and initiates people to the conservation of wildlife

### **4. Educational and scientific values.**

- The scientific value of wild life is the value of wild populations as object of scientific study
- Wild life and their habitats can be considered as field laboratories where scientists such as ecologists, evolutionists, geneticists, behavioral researchers and others can do study to extend their knowledge in their discipline
- The modern science of gene technology, which allows researchers to use and manipulate the gene characteristics of different species of animal and plants, continued discovery of new and useful genes that can be transferred from one species to another are scientific values of wild life

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- The educational value of wildlife is realized in the use of wild life examples in schools and at nature centers and parks

#### **5. Cultural values of wild life**

- Many forms of wildlife and their products have great significance in local cultures/ ceremonies or beliefs
- Certain trees and plants are collected for their special beliefs (healing properties) or for their ability to ward off evil spirits and events
- Amongst certain societies / local communities, feathers (from ostrich or other different colorful birds), skins from certain animals (e.g. leopard), horns from Greater kudu or other animals are used or displayed at different ritual ceremonies
- The Colobus Monkey in Ethiopia is sometimes called the forest monk and is said to have very special respect during times of fasting
- As a result, some people do not like to harass or kill Colobus Monkey

#### **6. Moral / Ethical/ religious reasons**

- The issue of moral principle relates particularly to species extinction
- We are morally obliged to our descendants and to other creatures to act prudently
- We cannot predict what species become useful to us
- Indeed we may learn that many species that seem dispensable are capable of providing important products, such as pharmaceutical, or are vital parts of life support systems on which we depend
- Thus, for reasons of ethics and self-interest, we should not knowingly cause the extinction of a species
- In principle non-consumption utilization will mean “making use of wildlife resource through tourism industry where animals are neither physically removed nor constrained in their natural habitats

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- The use may be direct through game viewing, photographing, and recreational and educational activities in the field

### **Challenges to types of wildlife utilization**

- Lack adequate scientific information on species identification ,populations and distributions
- Monitoring and super vision requires adequate financial resources which are often not provided
- Corruption in the operations making the objective not be achieved
- Strict/ stringent requirements set by consumers of wildlife products produced by export purposes
- Embargo by airlines not accepting transport wildlife products

## **5.4 Rules and regulations for wildlife resource utilization are identified and applied**

### **International Rules and Regulations**

**Protocol:** A protocol is an agreement that diplomatic negotiators formulate and sign as the basis for a final convention or treaty. The treaty itself may not be completed for many years

**Treaty:** A treaty is an agreement where the parties to it negotiate to reach common ground and avoid further conflict or disagreement. It is normally ratified by the lawmaking authority of the government whose representative has signed it. In the United States, the Senate must ratify all treaties

**Convention:** A convention begins as an international meeting of representatives from many nations that results in general agreement about procedures or actions they will take on specific topics e.g., wet international agreements necessary for several reasons:

### **Species migrate across international borders**

Monarch butterflies, Bird migration, Ocean animals (Whales, dolphins, turtles, sharks, fishes, coral, etc), eel and salmon, etc.

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## **International trade in biological products**

Bush meat, ivory, exotic pets, animal and plant parts for luxuriously food, clothes, medicinal use, decorative use, etc.

## **Benefits of biodiversity is of international importance**

Option and existence values, ecotourism, ecosystem protection, climate control, global food chain and production, genetic diversity, biological control and food security, etc.

### **I. Species level**

#### **Convention in International Trade in Endangered Species (CITES)**

- Established in 1973 in association with the UNEP and now ratified by > 175 countries
- Establishes lists (appendices) of species for which international trade is to be forbidden, controlled or monitored
- Appendix 1: Trade forbidden, ~675 plant & animals
- Appendix 2: Trade regulated and monitored, 3700 animals & 21000 plants

### **II. Habitat level**

- **Ramsar convention on Wetlands**, 1971 – 131 countries signed, 1150 sites, 96.3 million ha
- **World heritage Convention**, 170 countries participating, 144 sites, 142 million ha, Cultural + biological significance of natural areas, Recognizes obligation of world community to support sites financially
- **UNESCO Man and the Biosphere Program**, 1971, 408 biosphere reserves in 94 countries, 263 million ha, Integrating sustainable development and conservation

#### **Earth Summit (UNCED), 1992, 12 days of meetings, 178 participants**

- Managed to put the environmental crisis on the world agenda
- Established clear link between environmental protection and the need to alleviate poverty in the developing world
  1. Rio declaration
  2. Convention on Climate Change

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3. Convention on Biological Diversity
4. Statement of Forest principles
5. Agenda 21

### **Rules and regulations to hunting in Ethiopia**

1. Hunting any wildlife either within a controlled hunting area or a community Conservation area or any other potential wildlife area shall be prohibited unless carried out in accordance with conditions of a permit issued pursuant to these Regulations with reference to a specific controlled hunting area.
2. Hunting in the absence of a professional hunter and a hunting controller of the Authority or the concerned regional government shall be prohibited
3. Regions and the Authority shall demarcate controlled hunting areas and may give, through formal auction, concession to safari operators for a period not exceeding five years
4. No safari operator may be allowed to undertake hunting operations, without the consent of the concessionaire, in a controlled hunting area granted to another safari operator on concession.
5. Safari operation license shall be renewed every year from 8th July to the 6<sup>th</sup> day of August

### **Any controlled hunting area concession agreement may be terminated on any of the following grounds:**

- Unless renewed, where the concession period expires
- Where the safari operator allowed the hunting of wildlife species not included in the permit or in excess of the authorized quota
- Where the safari operator fails to settle, on time, the annual concession fee as provided in the concession agreement
- Where the safari operator fails to meet his obligations under the Concession agreement, in particular, with respect to natural resource management requirements within the controlled hunting area

### **Hunting license**

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### **1.Requirement of obtaining license**

- No person may hunt or capture any game animal, take wildlife products, conduct filming within or outside of protected areas or undertake research on wildlife and their habitat unless he is the holder of a license

### **2. Eligibility for license**

- Any person who has been convicted of an offence or whose license has been revoked due to a violation of the law with respect to the conservation of wildlife during the period of five years preceding the date of an application for a license may not be eligible for any license to be issued in accordance with these Regulations
- Any person who has not attained the age of 18 or who do not have a certificate of physical and medical fitness may not be eligible to apply for a professional hunting license
- Other eligibility requirements of any license shall be prescribed by directives to be issued by the Authority in consultation with the appropriate organs of regional governments.
- Any person who wants to get any license in accordance with these Regulations shall fill in the application form designed by the Authority and submit same together with evidences showing his fulfillment of the eligibility requirements

### **3. Issuance of license**

- The applicant shall be issued with the required license upon acceptance of an application submitted in accordance with these Regulations and upon payment of the appropriate license fee
- Any license shall be subject to the provisions of these Regulations and to the conditions and limitations endorsed thereon

### **4. Renewal of license**

- Any license shall be renewed every year upon payment of the regular license fee from the 8th of July to the 6th day of August. or upon payment of additional fee thereafter
- An application for renewal of license may not be accepted where the license is subject for suspension or revocation pursuant to the provisions of Article of these Regulations
- The applicant shall produce proof of government tax payment

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## 5.5 Identifying and using relevant sources of information

Source of information during consumptive and non-consumptive wildlife utilization includes:

- International conventions
- Treaty and protocol
- National rules and Regulations
- Organizational rules
- Regulation and guidelines
- Technical manuals
- Workplace guidelines

## 5.6 Implementing needs of customers' wildlife hunting

**Hunting** is the practice of pursuing living animals (usually wildlife) for food, recreation, or trade. In present-day use, the term refers to lawful hunting, as distinguished from poaching, which is the killing, trapping or capture of the hunted species contrary to applicable law. The species which are hunted are referred to as game and are usually mammals and migratory or non-migratory game birds.

Hunting can also involve the elimination of vermin, as a means of pest control to prevent diseases caused by overpopulation. Hunting advocates state that hunting can be a necessary component of modern wildlife management, for example to help maintain a population of healthy animals within an environment's ecological carrying capacity when natural checks such as predators are absent. Poaching by man, or hunting, has long been a complex decimating factor in the dynamics of Wild animals' populations.

**However there are advantages of planned harvest, such as:**

- Controlling the numbers of animals in a game population so that there are sufficient high - quality habitat resources for all animals

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- A situation maintains good animal quality and high rates of reproduction
- Without control of numbers, some populations are capable of damaging their habitat resources
- Altering the sex- ratio of a population so that habitat resources are used primarily by females as is necessary to maximize reproduction.
- Reduced competition among species of wild life by reducing numbers of a less favored species
- Controlling outbreak of disease in wild life by reducing the population
- Influencing the age structure of a population so that older animals of high trophy value are produced

**The successful and profitable hunting may depend on:-**

- Determining the method of hunting
- Determining the area in which hunting is permitted
- Controlling the number of licensed hunters using the area.
- Limit the hunting period
- Controlling the quota of harvestable animals
- Controlling the age/sex classes of animals hunted
- Controlling the types of firearms and ammunition used
- Protecting endangered animal in the hunting area
- Collect revenues - license fees and kill taxes

**Methods of protecting illegal poaching (hunting)**

- Arrest or apprehension of person engaged in illegal acts inside a protected area
- Documentation of illegal activities for court proceedings
- Confiscate of items prohibited with in protected areas or needed as evidence to testify to an illegal act
- Simple legal procedures in delivering arrested persons in to the hands of the law and filing charges
- Basic principles of public relations as applied to local people
- Generally, animals often die for a combination of causes for example malnourished animals are susceptible to disease and predation
- The proximate cause of death is often predation where as the ultimate cause is malnutrition or disease

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## 5.7 Conducting civet musk collection, tourism, and photography

### 1. Conducting civet musk collection

- The word “civet” also refers to the distinctive musky scent produced by civets
- The genus name “Civettictis” is derived from the French word ‘civette’ and the Greek ‘ictis’, meaning weasel, Old Italian Zibetho. Civets are also called "musang" in Malay
- Civets are nocturnal animals of the family Viverridae that includes civets, linsangs, genet
- Viverrids include diverse groups of carnivorous mammals restricted to the Old World
- Civet cat is two to three feet long that produces civet
- Civet musk is a substance found in a pouch near the sexual organ of the true civet cat, that is of the consistency of butter or honey, clear yellowish or brownish in color with a strong musky odor, used in perfume and chemically a complex mixture chiefly of fats and volatile oils.
- Civet, the secretion of the civet cat, known as **zabadin** Amharic, apparently related to the Arabic term, zabad, was one of those goods exported from Ethiopia that was almost exclusively reserved for the use of foreigners, who monopolized the technology for processing the civet into perfume.
- Civet is used widely in the perfume industry as a "fixative" to preserve and enhance the smell of other, more delicate fragrances
- The civet cat has long dark gray hair, marked with black spots and bands with noticeable ridge on the neck and the back
- This nocturnal animal possesses very rough fur, weights between 16 and 20 kilograms and it is about as large as a fox, but more heavily built. Civet cats of the same village defecate in the same place
- Civet musk is generally used as a fixative or a base in high quality perfumes, and continues to be highly demanded in spite of the development of synthetic substitutes for perfume processing
- In Ethiopia, the animal is found in altitudes between 750-3,250 m.a.s.l
- The animal is abundantly found in south and western part of the country

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- Nevertheless, civet farm are found only in Sidama, Gedeo, Kaffa and Bench maji zones
- The production of civet musk in Ethiopia is mainly for export as the user industries are not developed in the country

**Table 5.1 Civet Musk Production between year 2000-2006 E.C**

EXPORT OF CIVET MUSK (KG)

Year	Export
2000	280
2001	445
2002	454
2003	470
2004	375
2005	374
2006	3,937

*Source: - External Trade Statistics*



**Fig 5.1: African Civet Cat and Musk**

## Tourism

- **Tourism:** The activities of persons travelling to and staying in places outside their usual environment (here, the protected area) for not more than one consecutive year or tourism is the

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temporary, short-term movement of people to destinations outside the places where they normally live and work and their activities during the stay at each destination

- **Visitor:** a visitor is a person who visits the tourism selected area
- **Tourist:** Any visitor whose trip to a selected area includes an overnight stay.
- **Visitor use:** Any use made of the truism area by a visitor during his/her stay.
- In tourism, photographic images are the medium through which photogenic characteristics of destinations are represented and portrayed for the promotion of the destination
- This usage of photographic representations for place promotion has complex and multidimensional effects on how people perceive and experience a destination
- Currently, tourism depends greatly on photographic representation, in terms of both production and consumption)
- The production and distribution of photographic representations has an economic and affective value
- In fact, such images provide a tool through which it is possible to describe and perceive the world

## 2. Commercial photography and filming

- This is currently an emerging trend in wildlife utilization with the continuous development in film and photo technology
- Never before has man been able to capture still moments of wildlife or even their behavior as we do today
- This is fascinating and increases our curiosity to find more
- Film and photography are great ways to educate people about wildlife and the environment which in turn can be used to preserve and maintain it.

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**Figure 5.2: Bids are excellent for camera and filming**

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Self-check 5	Written test
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Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Instruction I:** choose the correct answer from give Alternative. You have given 1 Minute for each question. Each question carries 2 Point.

1. ----Is Wild life utilization that organism is available again and again to generate income, or its products are harvested without killing it?

A. Non - Consumptive utilization B. Consumptive utilization C. Hunting D. All

2. ----Is the practice of pursuing living wild animals for food, recreation, or trade?

A. Conservation B. Hunting C. marketing D. All of the above

3. ----is a person who visits the tourism selected area

A, Tourist B. visitor use C. visitor D. All of the above

**Instruction II:** Write short answers

1. Define Aesthetic value(5pts)

2. Define consumptive utilization of wild life(4pts)

3. Name five examples of consumptive wildlife utilization (5 point)

**Note: Satisfactory rating - 20 points**

**Unsatisfactory - below 20 points**

You can ask you teacher for the copy of the correct answers

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**Operation Sheet -5**

**5.1 Plan for consumptive wildlife utilization (Hunting)**

**A. Materials and tools :**

- Personal protective equipment's (Glove, boots shoes, eye goggle etc)
- Javelin/spear
- Binocular

**B. Procedures of consumptive wildlife utilization**

The following are some of the possible considerations to take before implementation of wild life utilization scheme such as cropping and culling in wildlife farming and ranching

- Determine the objective
- Select the species to be utilized
- Decide on area for the utilization program
- Determine stocking and harvesting levels or quota
- Decide /select suitable hunting techniques and agents
- Cropping method should be designed such that they will have elements of humanity, minimum disturbances to the herds, and efficiency

LAP TEST-5	Performance Test
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools, materials and Equipment you are required to perform the following tasks within 2 hour. The project is expected from each student to do it

**Task-1** Perform consumptive wildlife utilization.

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**LG #35**

## **LO #6- Establish and manage wild animal farming**

### **Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying and proposing sites
- Preparing materials, tools, and equipment
- Constructing rearing habitats
- Providing feed, water, and shelter to wild animal
- Harvesting, processing and marketing wild animals trophies

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify and propos sites
- Prepare materials, tools, and equipment
- Construct rearing habitats
- Provide feed, water, and shelter to wild animal
- Harvest, process and market wild animals trophies

### **Learning Instructions:**

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below.
- Read the information written in the information Sheets
- Accomplish the Self-checks

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- Perform Operation Sheets
- Do the “LAP test”

## Information sheet-6

### 6.1 Identify and propos sites

#### 1.Crocodile farming

- **Crocodile farming’** means the closed-cycle captive breeding and keeping of crocodiles in captivity intended for producing for sale products such as skins, meat, oil and claws
- **Crocodile ranching’** means the removal from the wild of crocodile eggs and/or juveniles for growth in a farm, often for the purpose of slaughter, and the manufacture for sale of products such as skins, meat, oil and claws
- **Favorable Climate conditions for crocodile farming:** For every type of crocodile climate is very important because temperature & humidity determine its sex and fertility
- Besides for its survival there must be 30-35 degree Celsius temperature
- In natural environment crocodile fertility rate is 80% but in farm condition fertility rate is 60%
- So it is necessary to ensure 32<sup>0</sup> c temperature and 99% humidity for getting crocodile’s maximum fertility.

#### The basic requirements for the well-being of farm crocodiles are:

- a) Appropriate and sufficient food and water to sustain health and vitality;
- b) Sufficient area to maintain well-being and to allow crocodiles to exhibit normal behavior;
- c) Protection from predation;

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- d) Protection from disease, including disease that can be exacerbated by management;
- e) Protection from extremes of climate, particularly during certain phases of their lives; and
- f) Protection from pain, distress, suffering and injury

## **2. Ostrich farming**

- The ostrich is very adaptable and thrives under extreme conditions
- Among the many ways of regulating its body temperature, it controls heat loss during cold weather by covering its thighs with its wings, and during hot weather, by lifting and moving its wings, it creates a gentle breeze
- The feathers are excellent insulators, minimizing heat gain from direct solar radiation, as well as reducing heat loss during cold desert nights
- It has a remarkable tolerance to heat, withstanding air temperatures of 56°C without undue stress
- Heat is lost by panting via the well-developed air sac system that avoids over ventilation of the lungs and consequent dangerous water loss
- Adaptations of the blood circulatory system permit its body to heat up to a greater extent than those of other warm-blooded animals while still keeping the head at a safe temperature
- Ostriches rarely seek shade, as most desert animals regularly do
- Furthermore, the ostrich's urine contains uric acid carried in a mucus-like substance that helps to minimize water loss
- Ostriches may be found in a variety of open habitats
- They normally avoid areas of thick bush or heavy tree cover, and inhabit wooded grasslands and other open country
- Semi-arid, open and short-grass plains are usually associated with the highest ostrich densities
- They are also able to thrive in very poorly vegetated areas

### **Behavior of the ostrich**

- Ostriches are completely diurnal

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- They are on their feet for most of the daylight hours, except when dust-bathing, resting or nesting
- They invariably sit down at dusk and remain virtually inactive throughout the night unless disturbed
- The chicks and juveniles are strictly gregarious and always remain in compact groups
- Adults are semi gregarious and tend to be attracted to each other for short periods
- Like camels, ostriches can travel for long distances in search of food and water
- In addition to temperature control, ostriches use their wings for a variety of display purposes, including courting, protecting eggs and young and submission
- The ostrich's posture communicates information to other birds

## **6.2 Preparing materials, tools, and equipment**

- Computer, software
- Stationary, brochures, booklets and pamphlets, field books
- Cable and its accessories for internet networking
- TV, radio, internet
- Binoculars, GPS, maps
- Mountain bicycle
- Field bags and tents, sleeping bag, sponge mattress
- Digital camera
- Abattoirs
- Knife, scissors
- Dart gun
- Musk collection dish
- Mesh wire, nails, barbed wire
- Feeding
- Cage

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- Drinkers(water)
- Chickens feeder
- Hammer

### **6.3 Constructing rearing habitats**

#### **Crocodile Housing**

Farms must have buildings and management systems that provides basic standards of care for crocodiles, including:

- a) Incubation and neonatal treatment;
- b) Maintenance of a high metabolic rate; and
- c) Elimination of stress;

#### **General housing arrangements**

The type of housing and yard dimensions required by crocodiles will vary with the geographic location of the crocodile farm, the age of the crocodiles, the management practices to be employed and the stocking density. The stocking density should be reviewed regularly and adjusted, taking into account age, pen conditions, behavioral needs and the likely occurrence of disease.

- All crocodiles need to be protected from climatic extremes, and crocodiles kept in pens, or an extensive impoundment, should be provided with adequate shade and protection from the elements.
- All crocodiles must have access to clean water at all times.
- Pens must be constructed to prevent unwanted movement of crocodiles into or out of enclosures.
- Farm design must include facilities that allow for the isolation and treatment of individual or limited numbers of crocodiles for extended periods. This must allow treatments to be administered in the water or in food.

#### **Breeding facilities**

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Allow the animals the ability to retreat from each other or separate pens should be provided.

- Crocodiles must have basking or ‘haul out’ sites in an enclosure that are large enough to allow the largest animal in the enclosure to lie to its full length and width without any physical restrictions.
- All specimens in the enclosure must be able to bask or rest on a dry surface simultaneously without physical contact and this surface must not be exclusively concrete
- Breeding systems used on crocodile farms are large communal pens, typically with multiple females and males in large ponds, and small breeding enclosures with one male and one to five females
- The proportion of adult females that nest in large communal pens varies from year to year, and this may reflect general ambient weather conditions (the same variation occurs in the wild) as well as other factors (food, pen design, stress, etc.)
- In small breeding enclosures, mixed results have been obtained (pen design, water quality, and food may be far more important factors in this situation)
- Small breeding enclosures should be partly subdivided so that the male and female can use separate areas in the enclosure
- These enclosures should also be visually isolated from adjacent pens and have constant water levels and water at least 1–1.2m deep.

### **Handling**

- Excessive or rough handling of eggs is to be avoided
- Eggs should be carefully removed from the nest and always kept in the same orientation
- A pencil line drawn along the top of the egg can be used to indicate its original position
- Eggs should be collected and moved as soon as possible after laying — ideally within the first 24 hours
- Eggs can be successfully collected and transported at any stage of development, although more care is needed between eight and twelve days after laying
- Regardless of embryo age, the eggs must not be overheated or dehydrated during collection and transportation

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- Temperature of eggs should be around 30<sup>o</sup> C. Eggs must not be kept in dry, exposed positions as they are likely to dehydrate.

### **Incubation**

The incubation environment is extremely important. The three major variables of the incubation environment are temperature, humidity and gas exchange.

- Eggs should be incubated at constant temperature between 30<sup>o</sup> C and 33<sup>o</sup> C
- Crocodilian eggs need to be incubated in humidity (99%+)
- The eggs should not be in direct contact with water and be able to absorb oxygen from the surrounding air
- A wide variety of incubators is used successfully for crocodile eggs, and no single system is recommended.

### **Hatchling and juvenile crocodiles must be provided with adequate nutrition**

- A typical juvenile crocodilian will consume about 15–20 percent of its body weight in food every week at a constant temperature around 32<sup>o</sup> C
- However, in outdoor pens, food consumption will vary greatly depending on ambient temperature and season
- The most common dietary deficiencies are those associated with calcium, vitamin A and vitamin E/selenium in fish-fed animals
- Calcium is usually added at 1– 2 percent of the crocodile’s weight in a palatable form such as bone-meal
- A standard vitamin supplement is widely used, although vitamin A is readily oxidized and degrades
- Only fresh vitamin supplements should be used and always stored in a refrigerator.
- Hatchlings are usually fed ground, minced or chopped food. ‘Chunks’ of food seem to be preferred, but grinding/mincing allows any supplements to be mixed into the food effectively.
- Intervals between feeding should change as an animal grows. Hatchlings are best fed once each day, juveniles of 1.2m once every second day

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**Fig 6.1: crocodile**

## **Civet Housing**

### **Selecting site for civet cat rearing**

- The African civet has been kept in captivity in Ethiopia for hundreds of years for musk production
- Civets are trapped in the wild using a noose with a bell attached
- The trappers charge between 120 and 150 ETB (Ethiopian Birr) for a civet, payable after two months to ensure survival, unfortunately, captive civets often die of a disease resembling canine parvovirus infection.

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**Fig 6.2:**Domesticating and reproduction civet cats

Most civet farmers keep 10-15 civets for years in individual cages (FAO, 2000). Their cages are so small that they are unable to even turn around which causes severe welfare problems. The cages are placed in rows on trestles in dark rooms of airless smoke-filled huts. Smoke is used to get rid of fly worry. For this purpose fire is left smoldering to maintain high temperature, which farmers believe increase the amount of musk production. No bedding is provided, and hypothermia is a common cause of death. Hygiene is usually very poor and urine and feces are left to decay on the floor

## Reproduction

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- Age at sexual maturity ranges from  $\frac{3}{4}$  to 1 year and gestation length was 65 to 75 days with a maximum of 4 kits per litter
- Females are polyestrous and are able to have 2 or 3 litters a year
- The average lifespan of the African civet is 15 to 20 years

#### **6.4 Providing feed, water, and shelter to wild animal**

- Obviously, wildlife must have food to survive
- Animals having adequate food and proper nutrition throughout their lives grow larger and remain healthier than animals that experience poor nutrition during part or all of their lives
- Generally, wildlife in good condition has higher reproduction rates, is more resistant to diseases, and can escape predators better than animals in poor condition
- Nutrition affects birth and death rates and is important in the overall survival of any wild animal population
- The availability of food varies over time (season) and space (geographic location)
- Food can be abundant in one area during one season, and in critically short supply in another area during other seasons
- Cold weather forces animals to consume more food to maintain body heat
- Diet selection in wildlife is driven by the quantity and quality of available food in concert with the nutritional needs of the animal
- For instance, coyotes are carnivores adapted for eating a diet of small animals (mice, voles, etc.) during much of the year
- However, when insects, fruits, and berries are abundant in summer, as much as 80% of a coyote's diet will consist of these food items

#### **Foods are classified as**

- Preferred : if they are more abundant in an animal's diet compared to its abundance in the field;

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- Staple : if they are eaten on a regular basis and meet the nutritional needs of the animal (an animal's second choice)
- Emergency: if they are eaten to fulfill short-term nutritional needs; and
- Stuffers: if they are eaten because there is nothing else to eat.

**Habitat for any wild animal must provide:**

- Cover (shelter) from weather and predators;
- Food and water for nourishment; and
- Space to obtain food, water, and to attract a mate.

**Water Requirements**

Animals require water for several reasons: digestion and metabolism, reducing body temperature, and removal of metabolic wastes. Most wildlife can survive for weeks without food but only days without water. Springs, creeks, farm ponds, and other water sources provide adequate standing water for most species of wildlife. Wildlife can also obtain water through a diet of green plants, from dew on leaves, or as a byproduct of the body breaking down fat and starches. Water requirements of animals vary, and sometimes the importance of free-standing water is over-estimated. However, the availability of properly distributed standing water usually enhances a wildlife population. Growth, size, reproduction, and general body condition usually benefit from optimum water supplies. If water is lacking, a rule of thumb would be to provide permanent water sources every 1/2 mile. When a wildlife species does require drinking water, its habitat must include a permanent water source, or the animal must move to areas with water during dry weather. Wild animals will not inhabit areas too far from water, even if food and cover are abundant. As a final note, lack of rainfall indirectly affects wildlife by reducing the quantity and quality of available wildlife food plants.

**Space and Home Range Requirements**

Each wildlife species requires a certain amount of space to move about, avoid or escape potential predators, locate a mate, obtain sufficient food and water for survival, and rest. This space is often referred to as the

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home range of an animal. Space requirements are behavioral and social responses that have taken hundreds of years to develop, ensuring an animal's well-being.

- **Wildlife requirements for food, cover, and water vary according to:**
  - ✓ wildlife species
  - ✓ age and sex
  - ✓ Physiological condition (gestation, lactation, antler growth, etc.)
  - ✓ time of year, and
  - ✓ geographic location

## **6.5 Harvesting, processing and marketing wild animals trophies**

### **Sell Items Products**

- Skin, Leather, bag, belt, shoe
- Meat used as food, Bone and teeth, Ornament
- In addition, other body parts are manufactured for the tourist trade, and include heads, skulls, teeth, backscratchers, key tags, or entire taxidermically prepared animals
- Other skin products

### **Feathers**

**Ostrich feathers** are used for cleaning fine machinery and equipment as well as for decorations and in the fashion industry. The quality of feathers produced from ostriches raised in Europe and North America differs from those produced in Africa. The best feathers come from the more arid regions of the world.

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**Fig 6.3: Ostrich and ostrich feathers.**

### **Ostrich meat**

Ostriches produce red meat that is very similar in taste and texture to veal and beef depending on the age at which they are slaughtered. It is high in protein yet low in fat.

The study indicates quite clearly that ostrich meat is far better from the health point of view as it contains far less fat, and particularly less cholesterol, than other types of meat

### **Ostrich skins**

Sold fresh to a tannery, or as finished leather or even manufactured accessories such as bags, clothing, wallets, purses and belts

### **Ostrich eggs**

- Can be sold as fertilized eggs for incubation, or infertile eggs can be blown and sold empty. Egg shells are sought after by artists and those in the craft industries for carving. Crushed egg shells as a calcium source in feed.

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**Fig 6.4: Ostrich skin and Eggs**

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Self-check 6	Written test
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Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Instruction I:** choose the correct answer from give Alternative. You have given 1 Minute for each question. Each question carries 2 Point.

1. ----wildlife requirements for food, cover, and water vary according to:  
A. Wildlife species B. age and sex C. time of year D. All of the above
2. \_\_\_\_Is used for cleaning fine machinery and equipment as well as for decorations and in the fashion industry?

**Note: Satisfactory rating - 4 points**

**Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

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