



Geographic Information System

By
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Application of GIS | in Wildlife Ecology

Today.....

1. Population viability analysis
2. Home range
3. Human-wildlife conflicts
4. Wildlife conservation
 - a. Population distribution
 - b. Habitat use
 - c. Current regional biodiversity

Population Viability Analysis

Population Viability Analysis

- The use of quantitative methods to predict the likely future status of a population or metapopulation

Or

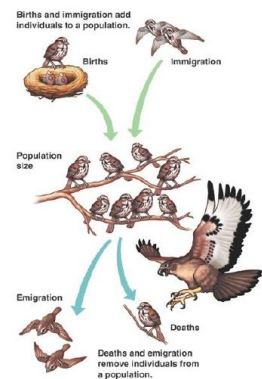
- A quantitative analysis of population dynamics with the goal of assessing extinction risk



Population Viability Analysis

What is population dynamics

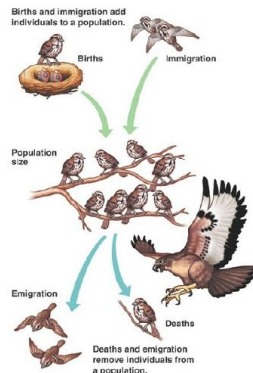
- Population sizes change over time. The population sizes are affected by many things
 1. Demographic uncertainty
 2. Environmental uncertainty
 3. Genetic uncertainty



Population Viability Analysis

Demographic uncertainty

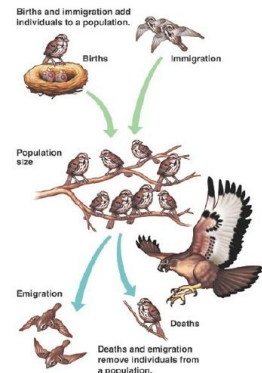
- Random events in survival and reproduction of individuals
- Example are skewed sex ration and unusual deaths
- These are mainly affect the small population



Population Viability Analysis

Environmental uncertainty :

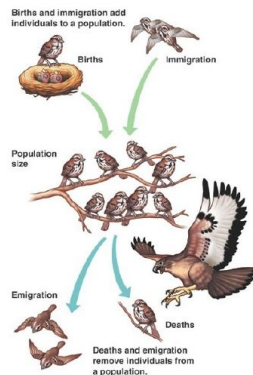
- Changes in weather, food supply, and the populations of competitors, predators and parasites
- Affects populations of all sizes



Population Viability Analysis

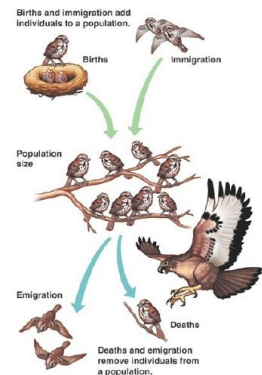
Genetic uncertainty

- a. important for small populations
- Founder effects (is the loss of genetic variation that occurs when a new population is established by a very small number of individuals from a larger population),



Population Viability Analysis

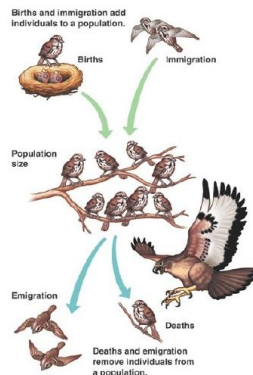
genetic drift (random changes in the frequency of alleles in a gene pool) and inbreeding (breed from closely related people or animals) are the genetic factors



Population Viability Analysis

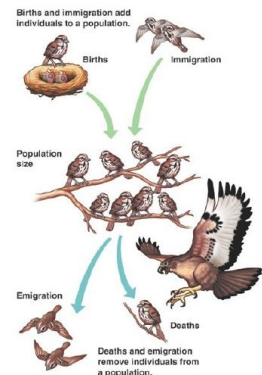
Information needed for population viability analysis:

- The mathematical and statistical modeling used in PVA requires lots of detailed ecological information on the growth and vital rates of the selected species to have any degree of accuracy



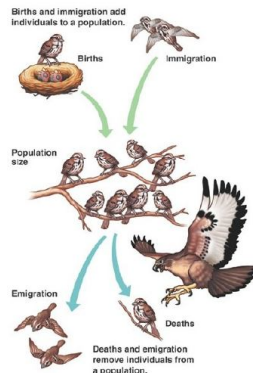
Population Viability Analysis

- For each species, information is required on the morphology, environment, distribution, biotic interactions, behavior, population demography, genetics and physiology



Population Viability Analysis

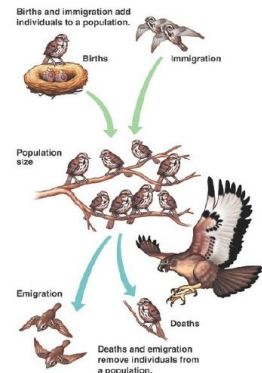
- This information may be compiled from
 - Published literature
 - Unpublished literature
 - Fieldwork
 - The knowledge of experts
 - The knowledge of locals



Population Viability Analysis

Factors affecting effective population size:

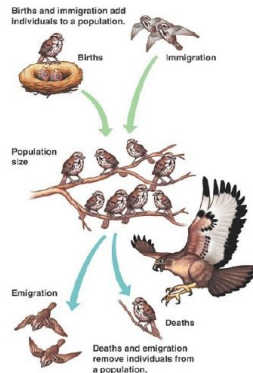
- Unequal sex ratios
- Variation in reproductive output
- Population fluctuations
- Whether or not generations overlap
- Age structure
- Dispersal
- The distribution of individuals
- inbreeding



Population Viability Analysis

Uses of PVA:

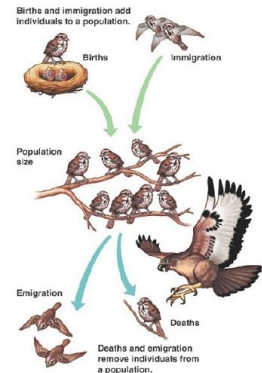
- Estimate the extinction probability for a population
- Determine the minimum viable population
- Determine the minimum reserve size
- Predict future population size
- Shows the importance of recovery efforts



Population Viability Analysis

Uses of PVA:

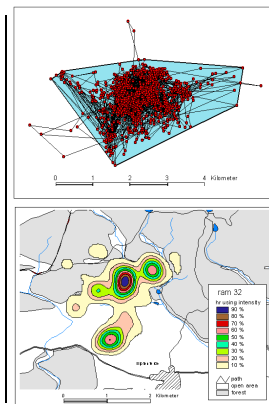
- Identify key stages of the life cycle on which to focus recovery efforts can be taken
- Compare proposed management options and develop action plans for recovery efforts
- Evaluate existing recovery efforts
- Explore and evaluate the potential input of habitat loss or the consequences of assumptions for small populations



Home Range Analysis

Home Range Analysis

- Home range is area transversed by the individuals in its normal activities for food gathering, mating and caring for young ones.
- There are several methods to estimate home ranges of wildlife. They are
 - Polygon method
 - Center of activity method
 - Nonparametric method



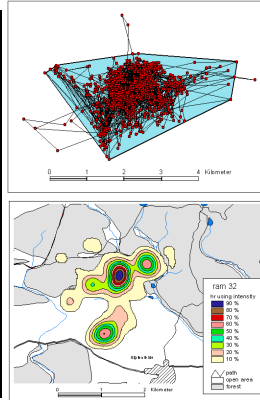
Home Range Analysis

Polygon method:

This estimators are derived from the peripheral points and it provides the extent of the animal range.

Center of activity method:

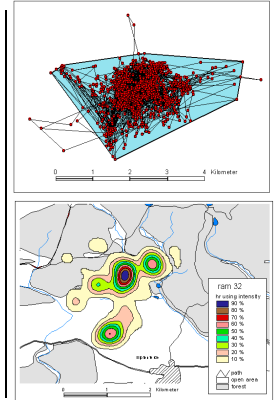
This estimators are derived by assuming a parametric form the utilization distribution function and putting them in the form of activity data



Home Range Analysis

Nonparametric method:

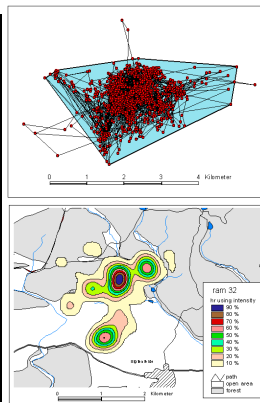
This estimators are derived by approximating the utilization distribution function using robust density estimator on geographic coordinates.



Home Range Analysis

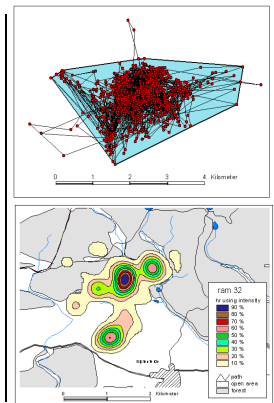
Data evaluation with a GIS:

The location of animals obtained by GPS telemetry Are stored as Cartesian coordinates. For further evaluation the data are converted to Gauss-Krueger coordinates and transferred as dBase files to a geographical information system



Home Range Analysis

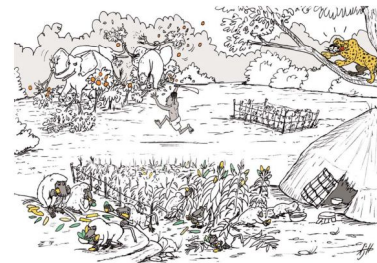
For construction of the GIS various thematic maps of the investigations areas are digitalized and overlaid with the position coordinates of the investigated animals. Then data is analyzed using ArcView software.



Human Wildlife Conflict

Human Wildlife Conflict

- According to the 2003 International Union for the Conservation of Nature (IUCN), human-wildlife conflict occurs when wildlife requirements encroach on those of human populations, with costs both to residents and wild animals



Human Wildlife Conflict

- Human-wildlife conflict has been in existence for as long as humans and wild animals have shared the same landscapes and resources.



Human Wildlife Conflict

- Human-wildlife conflict does not occur only in Africa. Nowadays human wildlife conflict exists in one form or another all over the world. Conflict between humans and crocodiles, for example, has been reported in 33 countries



Human Wildlife Conflict

- From history point of view, as per the fossil records first hominids fell prey to the animals with which they shared their habitats and shelters. Forensic evidence has recently demonstrated that the "Taung skull", perhaps the most famous hominid fossil, which was discovered in South Africa in 1924, belonged to a child who was killed by an eagle two million years ago

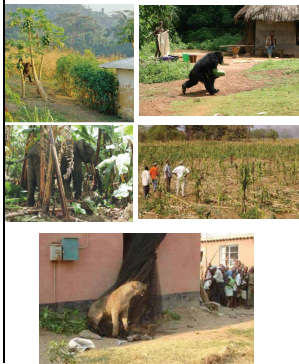


Human Wildlife Conflict

- In fact, the relationships between people and natural resources are extremely important to human societies.
- Since ancient times, human explore or exploit wildlife for subsistence and commercial purposes.
- The most important anthropogenic activities are deforestation and hunting. Deforestation causes fragments and hunting impacts species populations. In fact, it alters the overall function, structure and composition of the ecosystem.

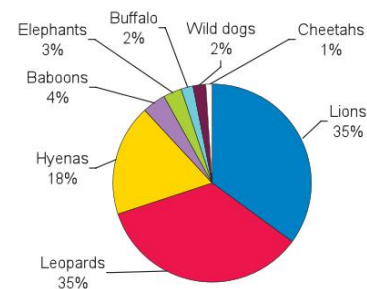
Human Wildlife Conflict

- Damage caused by wild animals are continuous and it can be a various forms which include
 - **Crop damage,**
 - **Livestock predation,**
 - **Property damage and attacks on humans**
- This accounts another way of economic loss of fellow Ethiopians and it is most neglected in this country like other developing countries.



Human Wildlife Conflict

FIGURE 1
Domestic animals killed by wild predators in the African Wildlife Foundation (AWF) Samburu Heartland, Kenya (% of reported deaths)



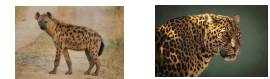
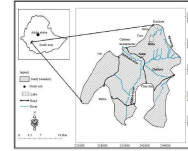
Human Wildlife Conflict

- As per the pastoral people, spotted hyena followed by leopard were responsible for predominant predation of livestock in Bali mountain (Atickem et al., 2010).



Human Wildlife Conflict

- The most problematic wild animals that damage crop were Vervet monkey and warthog (Datiko and Bekele, 2013a) and hyena and leopard were responsible for livestock predation around Chebera Churachura National park (Datiko and Bekele, 2013b).



Human Wildlife Conflict

- However, warthog was considered as notorious pest in Senkele Swayne's Heartbeest Sanctuary (Kumssa and Bekele, 2013).



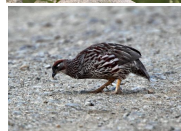
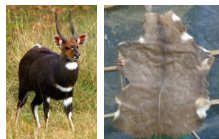
Human Wildlife Conflict

- Hyenas attacks on humans at regular intervals was reported in the town of Kombolcha in the Hararge region of eastern Ethiopia (Baynes-Rock and Marcus, 2013)



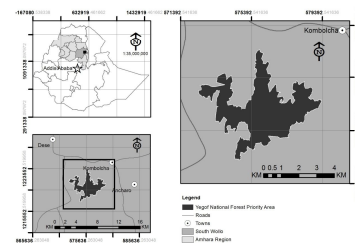
Human Wildlife Conflict

- In another independent study from biology department showed that local community utilizing the wild fauna from Yegof national forest priority area which are suppose to be a natural food for the some of the carnivore
- Menelik's Bushbuck; Amharic: Dukula.
- Klipspringer (Rock jumper)
- Erckel's francolin



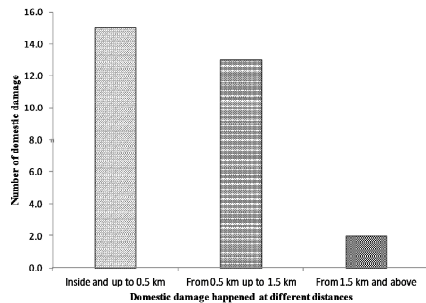
Human Wildlife Conflict

- Considering the facts that the problem of domestic damage are common around different reserve in this country.
- Biology department has made some efforts to identify such events



Human Wildlife Conflict

- Incidence of human wildlife conflict happened in and around Yegof National Priority Area



Wildlife Conservation

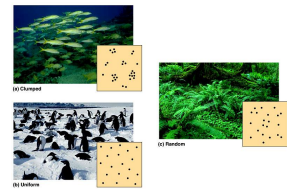
Population Distribution

- Organisms may live in flocks, herds or as solitary individuals or they may cluster around resources such as water holes. Distribution may vary with time changing with the breeding season.
- Ecologist recognize three major pattern of spatial distribution. They are



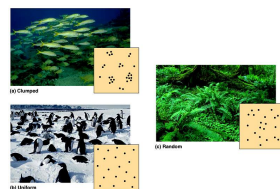
Population Distribution

- Aggregated distribution**
- In this many species form family or social groupings such as sheep herds, baboon troop, flocks of birds or schools of fish.
- Commonest pattern that can be observed in populations.
- Individuals are bunched into groups within the population.



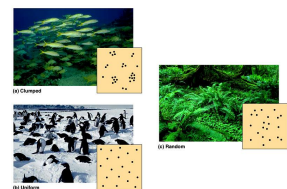
Population Distribution

- This is mainly results from the response to the unevenly distributed resources in their environment.
- Also there are positive interactions between the individuals.
- This supplies many advantages to the population such as protection from predators, reproduce and increase the population size and decrease the energetic cost of moving to do work.



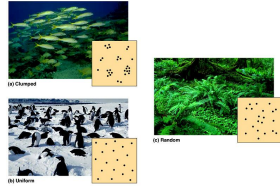
Population Distribution

- Advantages of aggregation distribution**
- Flocks or herds provide may eye on the lookout for localized food such as
- Schooling fish avoid predation by confusing the predator with countless flashing bodies dazzling in all directions.



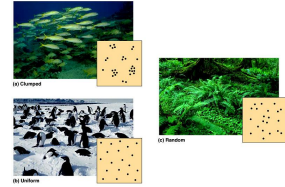
Population Distribution

- **Advantages of aggregation distribution**
- Some species such as elephant herds form temporary aggregations for mating.
- In some, animal populations cluster not for social reasons but because resources such as nutrients, shelter or water are localized.



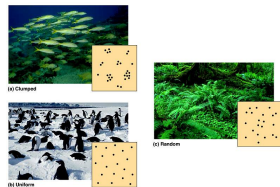
Population Distribution

- **Uniform population distributions**
- Uniform distributed organisms maintain a relatively constant distance between individuals.
- Spacing is often the result of defending scarce resources such as breeding sites, nutrients or water.



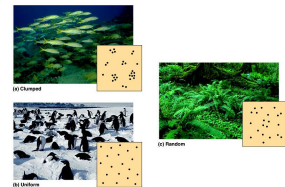
Population Distribution

- This distribution occurs most frequently among animals that defined territories.
- Shorebirds and african penguins re also found often in evenly spaced nests just out of reach of one another



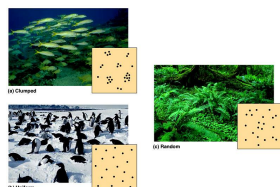
Population Distribution

- Other territorial species such as many birds of prey mate for life and mating pairs continuously occupy well defined very large and relatively uniformly spaced territories.
- Many animals such as cats mark their territories by chemical means to avoid violent face to face confrontations.



Population Distribution

- **Random population distributions**
- It is the least common distributions. In this pattern individuals do not form social groups, the resources they need are more or less equally available throughout the area they inhabit and resources are not scarce enough to required territorial spacing.



Population Distribution

- However, no vertebrate species that maintain random distribution throughout the year because they must breed.
- A behavior that makes social interaction inevitable but other than breeding and coming together to feed.



Population Distribution

- A crime feeding locations during salmon runs bears spend most of their time largely in randomly spaced isolation from one another except with their cubs



Habitat use

- Habitat – any area offering the resources (food, cover and shelter) and conditions that promote occupancy by a species.
- For example Cotton tails rabbit needs open rangeland to farm land. They utilize hedgerows, gardens and seek cover along fences to protect themselves from risks.



Habitat use

- However, white-tailed jackrabbit depends on the open prairie (Treeless grassy plain)
- It means that the area provides necessary resources and conditions for a species to occupy the respective places.



Habitat use

- **Habitat use:** The way the animal uses the collection of conditions and resources in a habitat. It is measured as relative amount of time spent in different areas within their habitat. Suppose more time they spend in a certain area means more use of resources or conditions at that location.



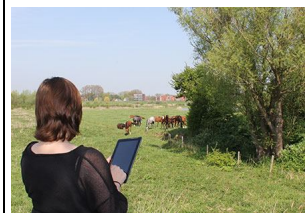
Habitat use

- So how can we study the habitat use:
- Explaining habitat use is a cornerstone of wildlife ecology. There are two approaches
- Experimental (manipulative): in this, alter factors that may be influential (Perturbation may be temporal and/or spatial and it may be lab or field based).



Habitat use

- Observational (mensurative): it is nothing but relative use to natural variations in factors that may influence (temporal and/or spatial) the habitat use
- Note: Most habitat use studies are observational



Habitat use

- **Habitat selection:** It is process both innate and learned by which animals choose which habitat components (conditions and resources) to use.
- To understand the choice of animal's habitat we use indicators which helps us to infer selection of particular conditions and resources.



Habitat use

- One popular indicator is use relative to availability. The resource selection function is one of the techniques used for habitat selection.
- What is resource selection function?
- It is observational approach to understand animal's habitat use typically within the home range which involves three steps



Habitat use

- Step 1: Obtain raw locations either by observation or by telemetry.
- Step 2: Convert locations points to utilization distribution. It is probability density function and this is nothing but quantifying time allocation or concentration of use within home range.
- Step 3: Multiple regressions that relate intensity of use to resources in a specified area typically within an animal's home range



Habitat use

Table 4
Top Far Eastern leopard RSF for the relative probability of selection at the study area scale in the Russian Far East, Southwest Primorsky Krai, 1997–2007. Bold values are significant at $p < 0.01$.

Coefficient	B	SE
Deciduous	-0.89	0.460
Meadows	-0.67	0.272
Shrubs	-0.74	0.222
Korean Pine	0.31	0.121
Agriculture	1.28	0.478
Ungulate Prey	5.27	0.802
Distance to main roads (km)	0.145	0.015
Snow cover (MODIS)	-0.34	0.204
Hillshade	-0.0027	0.0007
Dist (km) to Zapovednik	-0.853	0.007
Elevation (m)	-0.0036	0.0004
Constant, β_0	-4.94	0.110

* The constant (β_0) includes as the reference categories birch, oak, Korean pine, meadow, and agriculture, which were not significantly different from each other.

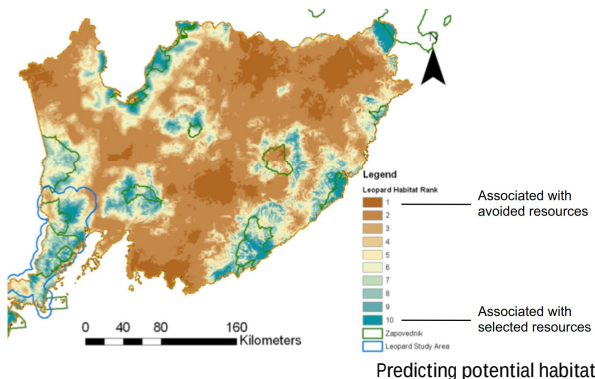


Amur leopard
(*Panthera pardus orientalis*)

avoided

Selected (big surprise!)

Habitat use



Current Regional Biodiversity

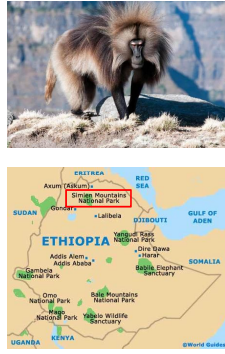
Bale Mountains Vervet:

This species was previously classified as Data Deficient but is now Vulnerable according to the International Union for the Conservation of Nature (IUCN, 2008). There is no definitive information about population size but the trend is said to be decreasing.



Current Regional Biodiversity

Gelada : The gelada bleeding-heart, is a species of Old World monkey found only in the Ethiopian Highlands, with large populations in the Semien Mountains.



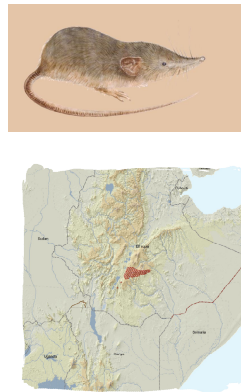
Current Regional Biodiversity

Ethiopian Highland Hare: The Ethiopian highland hare is a species of mammal. It is endemic to the Ethiopian Highlands, where it is almost entirely restricted to altitudes above those of other African hares.



Current Regional Biodiversity

Bale Shrew: The Bale Shrew is a species of mammal. It is endemic to Ethiopia. Its natural habitats are subtropical or tropical moist mountain forests and subtropical or tropical high-altitude grassland. It is threatened by habitat loss.



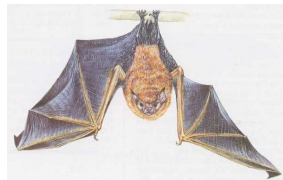
Current Regional Biodiversity

Bale Long-eared Bat (Flying mammal): This recently described species is endemic to the Ethiopian highlands where it is currently known only with certainty from the upper belts of the Haremma Forest in the Bale Mountains National Park



Current Regional Biodiversity

Ethiopian Woolly Bat (Flying mammal): It is found only in Ethiopia.



Current Regional Biodiversity

Ethiopian Wolf: The Ethiopian wolf is a canine native to the Ethiopian Highlands. It is distinguished by its long and narrow skull, and its red and white fur



Current Regional Biodiversity

Mountain Nyala: Mountain nyala are endemic to the Ethiopian highlands southeast of the Rift Valley.



Current Regional Biodiversity

Walia Ibex: is an endangered species of ibex. Only about 500 individuals survived in the mountains of Ethiopia, concentrated in the Semien Mountains.



Current Regional Biodiversity

Big-headed Mole Rat: Also known as the giant root-rat, Ethiopian African mole-rat, or giant mole-rat. It is endemic to Ethiopia's Bale Mountains. Its natural habitat is subtropical or tropical high-altitude grassland



Wildlife Management

Today.....

1. Habitat requirement
2. Current status of wildlife
3. Management of excess population by translocation

Habitat Requirement

Development of wildlife facility is nothing but development of wildlife habitat. So let us see the common habitat development practices one by one.



Habitat Requirement

Brush piles: These are piles of brush that are assembled to provide resting/escape cover and den sites for wildlife. Brush piles are used for cover by eastern cottontails and other small mammals.



Habitat Requirement

Songbirds may use brush piles for perch (Resting) sites, especially if the piles are located near feeding or nest sites.



Habitat Requirement

Also, if brush piles are adjacent to a water source, amphibians and reptiles may use them for breeding, feeding or resting.



Habitat Requirement

Creating snags: Snags are dead or partially dead standing trees that provide a number of important benefits to a variety of wildlife. Snags provide cavities for nesting and resting, perches for hunting and displaying, and an abundant supply of food for insect eaters.



pileated woodpecker

Habitat Requirement

Let us see some of the benefits provided for wildlife by snags

Cavities: For many birds and gray squirrel.



Gray squirrel

Habitat Requirement

Roost (Place where birds regularly settle to rest at night) for bats and **nest** sites for brown creepers



Habitat Requirement

Resting sites for many birds like

- Indigo bunting (singing perch),
- Raptors (A bird of prey) like American Kestrel (hunting perch),
- kingfishers like the belted kingfisher (fishing perch).



Habitat Requirement

Establishing permanent vegetation for wildlife: On some properties, trees, shrubs, and herbaceous plants have been planted to provide benefits for wildlife. In most cases, the plants selected provide either food or cover—or both. Let us see some of those examples.

Habitat Requirement

Plant Type	Examples	Examples of wildlife benefits
Evergreens, conifers	white pine eastern hemlock rhododendron	• thermal cover for ruffed grouse • nest sites for mourning dove • food for red squirrel
  		

Habitat Requirement

Plant Type	Examples	Examples of wildlife benefits
Nut trees	oak hickory beech	• food for wood duck, ruffed grouse, wild turkey, blue jay, black bear, eastern chipmunk, squirrels, white-tailed deer
   		

Habitat Requirement

Plant Type	Examples	Examples of wildlife benefits
Fruiting trees, shrubs, and vines	black cherry elderberry blackberry dogwood grape vine	• food for wild turkey, gray catbird, cedar waxwing, many songbirds, black bear, gray fox, white-tailed deer, and small mammals
  		

Habitat Requirement

Plant Type	Examples	Examples of wildlife benefits
Cool-season grasses and legumes	Kentucky blue-grass orchard grass red clover white Dutch clover birdsfoot trefoil	• insects for poult of ruffed grouse, wild turkey • food for meadow vole, eastern cottontail, white-tailed deer • nest sites for field sparrow, song sparrow, meadow vole • hunting sites for hawks,



Habitat Requirement

Plant Type	Examples	Examples of wildlife benefits
Warm-season grasses	switchgrass big bluestem little bluestem indiangrass side oats grama	• nesting cover for upland game birds, waterfowl, and ground nesting songbirds • foraging cover for upland game birds, waterfowl, songbirds, eastern cottontail • food (seeds) for songbirds • winter cover for game birds, waterfowl, cottontail rabbits



Habitat Requirement

Plant Type	Examples	Examples of wildlife benefits
Wildflowers, forbs	cardinal flower New England aster bee balm joe-pye weed columbine	• nectar for butterflies, moths, bees, hummingbirds • seeds for songbirds • forage for white-tailed deer



Habitat Requirement

Fencing and tree shelters: When trying to establish new plants for wildlife, it is sometimes necessary to protect plants from browsing and other damage until the plants are well established.



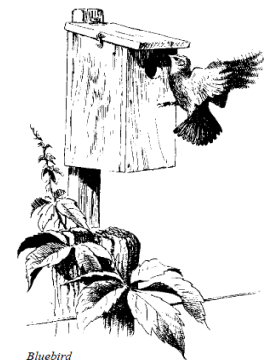
Habitat Requirement

Forest edge improvement: Many species of wildlife use edge habitat for nesting, feeding, and travelling. The main goal of forest edge improvement is to increase available food and cover along a forest edge by providing a variety of vegetation types and layers, from the shortest herbaceous vegetation to the tallest trees.



Habitat Requirement

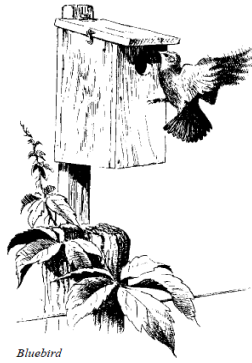
Nest boxes and other nesting structures: One of the most popular ways to improve habitat for wildlife is to provide nest boxes or structures.



Bluebird

Habitat Requirement

Nest boxes, platforms, and other types of nesting structures provide nest sites for wildlife in areas where natural nest sites (particularly cavities) are absent or available only in low numbers. They are also used to attract wildlife to specific areas even when nest sites are not limited.



Habitat Requirement

Temporary pools:

Temporary pools are wetland habitats that fill with water during a rainy season and then dry up later in the year.



Habitat Requirement

Wildlife corridors: is a link of wildlife habitat, generally native vegetation, which joins two or more larger areas of similar wildlife habitat.



Habitat Requirement

Corridors are critical for the maintenance of ecological processes including allowing for the movement of animals and the continuation of viable populations. By providing landscape connections between larger areas of habitat, corridors enable migration, colonization and interbreeding of plants and animals.



Habitat Requirement

Corridors width and design:

As a general rule the wider the corridor the better. Wider corridors provide for greater diversity, have less impact from adjoining land uses and associated edge effects (e.g. weeds, predators etc.) and provide habitat in their own right. Generally, wildlife corridors can be identified at 3 levels.



Habitat Requirement

Regional corridors are primary landscape connections between larger important areas of habitat. They are generally substantial in width (> 500m) and provide not only for dispersal of individual species but act as habitat in their own right for a range of species.



Habitat Requirement

Sub-regional corridors:

These should be wide enough to provide landscape connections for species movement and dispersal (generally > 300m). Sub-regional corridors may not be large enough to provide substantial species habitat, but be sufficiently wide to cater for a wide range of species movement and dispersal.



Habitat Requirement

Sub-regional corridors:

These should be wide enough to provide landscape connections for species movement and dispersal (generally > 300m). Sub-regional corridors may not be large enough to provide substantial species habitat, but be sufficiently wide to cater for a wide range of species movement and dispersal.



Habitat Requirement

Local corridors are smaller, less defined linkages that provide local connection of remnant patches of vegetation and landscape features such as creek lines, wetlands and ridgelines. They may in some cases be less than 50m in width and as such may be influenced by edge effects. Local corridors are an important component of an overall regional landscape conservation framework.



Habitat Requirement

Management of a

corridor should aim to retain and enhance the existing vegetation cover and wildlife habitats. This should include retaining vegetation cover and structure including groundcovers, shrub layer and canopy species, and logs on the ground.



Habitat Requirement

Overall, corridor management should aim to ensure that ecological processes and corridor function are maximized:

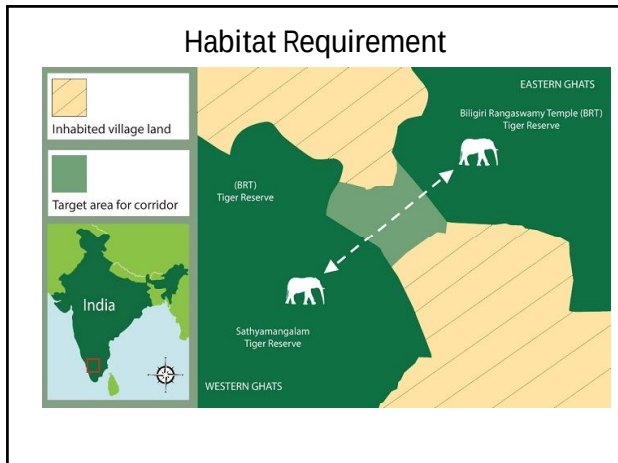
- Maintain and increase vegetation cover and habitat quality to maximize connection between larger remnants of vegetation. This will help dispersal of wildlife populations between larger remnants and ensure genetic.



Habitat Requirement

- Provide specific habitat resources and ecological needs, particularly for threatened species interchange and seasonal wildlife movement.
- Maximize corridor width and function by revegetation and control of weeds and feral animals.
- Maximize the protection / linkage of landforms





Current Status of Wildlife in Ethiopia

Current Status of wildlife in Ethiopia

As you all know that the biogeography of the Ethiopia is characterized by highland plateau which has resulted in significant endemism (Endemism is the ecological state of a species being unique to a defined geographic location, such as an island, nation, country or other defined zone, or habitat type).

Current Status of wildlife in Ethiopia

Let us see status of plant and animals.

- Ethiopia has over 6,000 species of vascular plant (with 625 endemic species and 669 near-endemic species, and one endemic plant genus),

Current Status of wildlife in Ethiopia

- 862 avian species (16 endemic species and two endemic genera),
- 288 species of mammal (31 endemic species and six endemic genera),
- 201 species of reptile (9 endemic species),
- 64 species of amphibians (30 endemic species),
- 150 freshwater fish (40 endemic species).

Current Status of wildlife in Ethiopia

The vegetation of the country falls into five recognized biomes:

- Sudanian,
- Congo- Guinean,
- Sahel arid zone,
- Somali-Maasai,
- Afro-tropical and mountain.

Current Status of wildlife in Ethiopia

There are a number of charismatic flagship species, most notably the

- Gelada (an endemic genus, the world's only grazing primate),
- Mountain Nyala,
- Ethiopian wolf,
- Walia ibex
- Giant lobelia.



Current Status of wildlife in Ethiopia

As we have seen in previous class that conservation is an effort to maintain and use natural resources wisely in an attempt to ensure that those resources will be available for future generations. To do such conservational activities there should be some conservational organization at national level.

Current Status of wildlife in Ethiopia

The principal organization for promoting such conservation activities in Ethiopia is EWCA (Ethiopian Wildlife Conservation Authority).



Current Status of wildlife in Ethiopia

The most obvious tool at its disposal is the establishment and conservation of protected areas.



Current Status of wildlife in Ethiopia

And also controls the hunting and promotion of ecotourism.



Current Status of wildlife in Ethiopia

Ethiopian Wildlife Conservation Authority (EWCA) is a governmental organization under the Ministry of culture & tourism given the authority to undertake conservation and sustainable utilization of wildlife in Ethiopia.



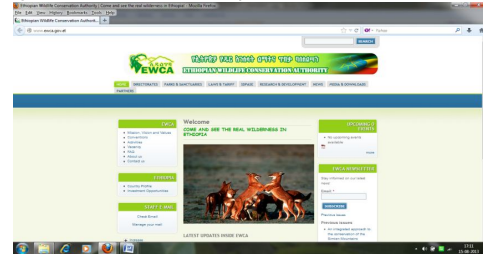
Current Status of wildlife in Ethiopia

EWCA works closely with national and International stakeholders on wildlife conservation.



Current Status of wildlife in Ethiopia

It actively participates in different seminars, experience sharing workshops, conferences and other relevant meetings on wildlife conservation, biodiversity, ecosystem management, Environmental management & other related aspects.



ESTABLISHMENT

Emperor Menelik II issued the first regulation on Oct 16, 1908 and it had 9 articles strictly forbidden young elephant hunting.



ESTABLISHMENT

The first wildlife proclamation (public statements) was issued in May 29, 1944. it was endorsed by following the proclamation by Ministry of agriculture in 1945.



ESTABLISHMENT

UNESCO (United Nations Educational, Scientific, and Cultural Organization) delegation team in 1964 recommended the establishment of wildlife conservation institute.



ESTABLISHMENT

Based on this, by order No.54/1969 and 59/1969 Awash National Park and Semien National Park were established.



ESTABLISHMENT

In 1970 provided legal establishment of Ethiopian Wildlife Conservation Organization (EWCO)



ESTABLISHMENT

Proclamation 380/2003 transferred all its duty and responsibility to Ministry of Agriculture and Rural Development. Eventually the Ethiopian wildlife Conservation Authority (EWCA) is established.



ESTABLISHMENT

At present, 14 national parks, 3 wildlife sanctuaries, 7 wildlife reserves and 24 controlled hunting area are officially managed.



ESTABLISHMENT

These all are managed by federal, regional and private parties. Protected areas managed by different institutions are given in separate Tables.



ACTIVITIES OR FUNCTIONS OF THE ORGANIZATION

- To devise ways and means for the preservation and control of wildlife through coordinated legislative and practical measure

ACTIVITIES OR FUNCTIONS OF THE ORGANIZATION

- To sponsor the setting up of national parks, wildlife sanctuaries and zoological gardens

ACTIVITIES OR FUNCTIONS OF THE ORGANIZATION

- To promote public interest in wildlife and the need for its preservation in harmony with natural and human environments

ACTIVITIES OR FUNCTIONS OF THE ORGANIZATION

- To advise the government on policy in respect of export of plants and animals
- To prevent cruelty to birds and beasts caught alive with or without injury

LEGISLATIONS

In my knowledge, There is no unified national wildlife conservation law. Enforcement of laws regulating harvest will be the first wildlife management tool, preceding refuge (A place or state of safety from danger or trouble) establishment, predator control, stocking and habitat manipulation.

LEGISLATIONS

In this regard, objectives are absolutely essential for the design analysis and evaluation of all wildlife management activities. Without them, there is no direction, no destination, and no criteria for goodness or optimum performance. So wildlife law enforcement has the following objectives

LEGISLATIONS

- To prevent wildlife populations, particularly endangered, migratory and breeding population from becoming destroy completely in an area.
- To protect the ecological health of habitats especially from conflicts of land users.

LEGISLATIONS

- To assure that desired, calculated harvests are achieved.
- To regulate the rate of exploitation of wildlife populations.
- To assure each licensed person an equal opportunity to pursue fish or game.

LEGISLATIONS

- To maximize the opportunities of all citizens, licensed or not, to experience benefits from wildlife.
- To assist in balancing users satisfactions with expectations.

WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

There are two main ways to conserve biodiversity. These are termed *ex-situ* (i.e. out of the natural habitat) and *in-situ* (within the natural habitat-national parks and nature reserves).

WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Conservation outside the national park and nature reserve where organisms brought out of their natural habitat of the species for conservation of the elements of biodiversity is *Ex-situ* conservation. *Ex-situ* conservation means literally, "off-site conservation".

WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

It is the process of protecting an endangered species of plants or animals outside their natural habitats. The purposes of ex-situ conservation are recreation, education research and conservation. It aims to conserve the biodiversity but not include its habitat.

WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Ex-situ conservation can be done by maintaining sample populations in **zoos and botanic gardens** which are considered by universal thinkers and environmentalists as important means of conserving biodiversity.



WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Zoos became not only places of entertainment and observing animal behaviour, but as institutions, museums, These forms may be reproduced research laboratories and information banks of rare animals.



WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Zoos and botanic gardens are small artificial forests in cities and places for animals, birds and reptiles in captivity, and centres for their reproduction. Zoos and botanic gardens are banks to keep sperms of rare animals and reptiles threatened by extinction.



WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Zoos are established for animal diversity conservation (1100 zoos are in the world), the role of zoos in the conservation of biodiversity became a legal obligation in many countries.



WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Botanical gardens are established for conservation of plants (>630 botanical gardens in the world).



WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Advantages of *Ex-situ*

- To conserve species that has major threats of habitat degradation and loss.
- To collect genetically representative samples.
- Maintain samples off site in good condition for a long time, and be able to use them if needed.

WILDLIFE OUTSIDE OF NATIONAL PARKS AND NATURAL RESERVES

Advantages of *Ex-situ*

- Use samples to reintroduce genetic material to the wild if necessary.
- To generate income through tourism and be used to conserve the species at in situ.
- Relative cost of *ex situ* conservation is low.

MANAGEMENT OF EXCESS POPULATION BY TRANSLOCATION

TRANSLOCATION

Translocation in wildlife conservation is the capture, transport and release or introduction of species, habitats or other ecological material (such as soil) from one location to another. It contrasts with reintroduction, a term which is generally used to denote the introduction into the wild of species from captive stock.

TRANSLOCATION

Translocation is an effective management strategy and important topic in conservation biology. It decreases the risk of extinction by increasing the range of a species, augmenting the numbers in a critical population, or establishing new populations thus reducing the risk of extinction. This improves the level of biodiversity in the ecosystem.

TYPES OF TRANSLOCATIONS

Introduction: Introduction is the deliberate or accidental translocation of a species into the wild in areas where it does not occur naturally.

Introduction of non-native species occurs for a variety of reasons. Examples are economic gain, improvement of hunting and fishing, ornamentation of roads.

TYPES OF TRANSLOCATIONS

Re-introduction: Re-introduction is the deliberate or accidental translocation of a species into the wild in areas where it was indigenous at some point, but no longer at the present.

Re-introduction is used as a wildlife management tool for the restoration of an original habitat when it has become altered or species have become extinct due to over-collecting, over-harvesting, human persecution, or habitat deterioration.

TYPES OF TRANSLOCATIONS

Re-stocking: Re-stocking is the translocation of an organism into the wild into an area where it is already present.

Re-stocking is considered as a conservation strategy where populations have dropped below critical levels and species recovery is questionable due to slow reproductive rates or inbreeding.

TRANSLOCATIONS GUIDELINES

In translocation process, one need to take care many aspects. There are so many complications in this process as we have discussed in previous classes. For your inofrmation there are guidelines. Let us see those guidelines one by one.

TRANSLOCATIONS GUIDELINES

- Before a translocation assess disease risks and take precautions to minimize these risks.
- Maintain the animals in captivity as near to the site of capture/release as possible
- Maintain the animals in captivity for as short a time as possible.
- Prevent contact between the animals in question and those from a different source or of a different species.

TRANSLOCATIONS GUIDELINES

- Keep and handle the animals under hygienic conditions to minimize the risk of parasites being passed from the keepers to the animals.
- Avoid the transfer of parasites from foodstuff to the animals.
- Clinically healthy animals should not be regarded as parasite free and therefore should be treated with caution.

TRANSLOCATIONS GUIDELINES

- Translocation to areas devoid of related species helps decrease the risk of inter-specific transmission of disease

TRANSLOCATIONS GUIDELINES

- Overall, **Quarantine** the animals. Quarantine means a state, period, or place of isolation for people or animals that have arrived from elsewhere or been exposed to contagious disease.

“If an egg is broken from outside
force....life ends
but
it is broken from inside force life begins.
So
Great things always begin from our inside.

THANK YOU WITH BEST WISHES