Introduction to Wildlife Management

Lesson Aim

Develop a concept of how humans manage wildlife populations in different situations around the world.

WHAT IS WILDLIFE MANAGEMENT

Wild animals require three basic factors for survival: water, food and shelter. An animal's habitat (the area that a wild animal occupies) must provide the animal with these essential resources and environmental needs. Wildlife management is the manipulation of wild animal populations and their habitats within the ecosystems that support them. Animals may live in several ecosystems during their yearly cycle, for instance the vastly different ecosystems and biomes occupied by migratory birds. Wildlife management may also include human cultural activities such as education and access management.

All animals require three basic factors for survival

Wildlife management has three main areas of focus:

1. Managing wildlife habitats

2. Managing people

3. Managing wildlife populations so that the population will either change or remain constant.

Wildlife management includes activities such as:

- Managing parks and reserves

- Altering and rehabilitating wildlife habitats

- Providing education and extension programs for special interest groups

- Maintaining threatened populations

- Reducing or eradicating pest species and weeds

- Protecting human life and property

- Managing wildlife harvest and poaching

The types of wildlife management and the appropriate techniques vary depending on location and species. For some species and habitats, management principles are well established. For an increasing number of lesser known threatened species, you may have to rely on locally applied methods of wildlife management. It may be necessary to undergo monitoring and research within management action plans to test and refine your methods of wildlife management.

This course is designed to give students a broad-based introduction to the principles and practices of wildlife management common to many species around the globe.

Approaches to Wildlife Management

Preservation

Wildlife preservation is maintaining a wildlife population or habitat as close as is practicable to its natural state; areas are protected from alteration from their natural state, and human influence is minimised. However, in some cases active management may be required to maintain or recreate naturally occurring populations of animals and plants, control or eliminate exotic species, or to protect threatened areas of critical habitat. Changes in natural ecosystems, such as vegetation succession in forests or swamps may not always be favourable for some wildlife, and initiating successions through fire or other means may be implemented to maintain ecosystem diversity.

An example of preservation is the management of the whooping crane (*Grus americana*), found in North America, where its population has grown from a critical level of 15 individuals to just under 300 due to the preservation of key breeding sites such as Wood Buffalo National Park. An ecosystem example is the establishment of world heritage areas for nature conservation.

Conservation

Conservation can have various meanings to different groups. In this course, conservation means that wildlife managers are actively managing a natural system to maintain and use natural resources in such a way as to preserve its biodiversity for future generations of humans and animals. Therefore, wildlife conservation is a sector of the sustainable management of biodiversity. For example, in Uganda, East Africa, statutes are in place to allow for the protection of wildlife whilst allowing managers to sustainably harvest resources such as timber.

Wildlife Management

Wildlife management involves the manipulation of wildlife populations to achieve specific objectives for wildlife and humans. Management is the focus of this course. It involves the manipulation of populations to achieve specific objectives for wildlife and humans. This manipulation may be in order to increase the size of the population, to "harvest" animals in a sustainable way or to reduce or stabilise a population. Management can be applied to both pest and desirable species. For example, across most of Australia, the red fox (*Vulpes vulpes*) is a major pest species as a predator of native wildlife and livestock. Wildlife managers are controlling red fox populations through a baiting program in conjunction with trapping and shooting.

Purpose of Wildlife Management

There are many different reasons why we might want to manage wildlife and the relative importance of those reasons can vary from place to place, both within regions, nations, and globally. This importance can also change from time to time.

Managing a particular species may be critical in one country, where for various reasons it has become a pest; while the same species may in a different country be controlled by nature with very little need for intervention by man. For example, wild rabbit populations in the UK are largely controlled by natural predators such as foxes. But in Australia, introduced European rabbits (*Oryctolagus cuniculus*) have few predators and, in some cases, have reached major pest populations where they are threatening habitats and competing with native species for resources. In such cases, they are managed by biological control through pathogen release, and through trapping, burring warrens and commercial harvesting.

Reasons for managing wildlife may (amongst other things) include:

- The population of a native animal may be increasing in excess of its available resources, which may then be impacting (or may impact) on other species (plant and animal) potentially permanently damaging ecosystems.

- Non-indigenous (exotic) species in an area may increase or change resulting in natural species extinction.

- Climate change or abnormal events (e.g. natural disaster) may have changed or caused instability in the balance of nature.

- The need to control diseases carried by wild or domestic animals within the management area that may be detrimental to either the wild or domestic species, or may be zoonotic and possibly affect humans (e.g. Rabies).

- Conserving threatened species.

- Species and ecological research.

- Sustainable extraction of natural resources (e.g. sustainable forestry, fisheries).

- Protecting individual animals from poaching or other illegal harvest (e.g. elephant poaching in Africa).

Goals of Wildlife Management

The goals of wildlife management include:

- Maintainace of desirable population levels of species within ecosystems.

- Population reduction or extirpation of undesirable species.

- Sustainable management of populations for harvesting such as for harvesting wildlife for meat.

- To specifically protect and support threatened species.

DECISION MAKING IN WILDLIFE MANAGEMENT

Three decisions need to be made to effectively manage wildlife.

1. What is the desired goal?

2. Which management option is appropriate based on the goal?

3. By which action is the management option best achieved?

The first decision requires a value judgment. The other two require technical judgments.

Who are the Decision Makers?

Decisions in wildlife management are not the sole right or responsibility of the wildlife manager: Decisions are made in consultation with a range of stakeholders that may be affected by, or have an interest in, the decision. Stakeholders in wildlife management may include local and national governmental wildlife management agencies, landholders, local residents, environmental groups, hunters and pet owners.

It is up to the wildlife manager, as part of their role, to appreciate stakeholder needs and experience, and to effectively liaise with stakeholders in decisions made in regard to wildlife management programs. Once a decision has been made, goals have been set, and a program established, it is the wildlife manager's responsibility to implement these decisions, and to report the successes and drawbacks of the program at regular stages.

Making the Right Decision

Decisions regarding wildlife populations can be far reaching and have a significant impact upon the environment. In order to determine whether a specific goal is the correct one, we need to consider the impacts of different possible management options, with these often weighted by value judgements.

Value judgements can neither be considered to be right or wrong, but do have a big influence in the decision making process. For example, some people would argue for the elimination of a species based on an intrinsic threat from an animal (for example, snakes); whereas other people would provide ethical reasons for why this species should be allowed to survive. Technical reasons for a viewpoint (such as the fact that snakes can pose a risk to human health) are more objective in decision making, but need to be combined with value judgments in order to make the best decision that takes into account the needs of both humans and wildlife.

IMPORTANT CONCEPTS AND CONSIDERATIONS

Range, distribution and habitat.

A species range is the broad geographical area in which it is found (e.g. African plains); its distribution is within its range (e.g. lakes); its habitat is the specific geographical type and vegetative structure where it inhabits (e.g. reed beds).

Needs of wildlife

All animals require three basic factors for survival:

- Food

- Water

- Habitat (shelter and sufficient space)

What is a good wildlife habitat?

Good wildlife habitats are environments where animal species can maintain populations and reliably complete their life cycle. A species' habitat needs may vary on its life cycle stage. For instance, juvenile iguanas are generally predators on invertebrates, but as adults, they are mainly vegetarian. Amphibians may need both aquatic habitats for reproduction, and terrestrial habitats for their adult stage.

There are five main types of habitat:

- Large trees (both living and dead)

- Understorey habitats (e.g. trees and shrubs of varying sizes)

- Dry ground habitats (e.g. rocks, logs, groundcover plants and grasslands)

- Wet ground habitats (e.g. beaches, mangroves and wetlands)

- Aquatic habitats (e.g. marine, estuaries and lakes)

Population Limiting Factors

A population limiting factor is any factor that restricts the wildlife population from growing by causing mortality or affecting birth rates. Essentially this will be the habitat requirement that is in short supply, such as inadequate water, food or shelter. Population limiting factors that are important at different life stages are critical habitat components. For example, the presence and distribution of tree hollows for reproduction can be a limiting factor to the success of certain parrot populations; and the availability of water sources can limit populations of grazing mammals. Both pathogens and parasites, including exotic species, may be significant population limiting factors with some species, and have even resulted in the recent extinction of many amphibians.

Carrying Capacity

The carrying capacity of a habitat is the population of a species that the habitat can support, with this concept addressed in greater detail in Lesson 5.. The carrying capacity can be maintained, increased, or decreased by manipulating a limiting factor. Carrying capacity is particularly evident with island populations.

Succession

This concept refers to the replacement over time of an existing biological community with another, as an orderly and predictable change in the composition or structure of a community. Several stages of succession within a management area can significantly increase wildlife diversity.

Wildlife managers need to consider the effect of succession on vulnerable wildlife when planning for their management. Whilst some species may thrive with changes to a biological community, it may produce deteriorating conditions for others. In some cases, grasslands grazing, or the use of fire, prevents successional vegetation by bushes and then trees. For example, the threatened bobwhite

quail (*Colinus virginianus*) shows a clear preference for early successional vegetation after fires. Therefore, to manage habitat for the bobwhite's survival, regular burning is required. Other examples, are the range of arboreal mammals that only inhabit forests at different successional stages, thus requiring wildlife managers to assure that all these stages are present in sufficient amounts to support each species.

Habitat Fragmentation

Habitat fragmentation occurs through both natural processes and human influences. For instance, in nature many wetlands are naturally fragmented habitats for some dependent species. With industrialisation, human population growth and associated habitat clearing, many natural habitats may be separated into smaller and more isolated patches. This artificial fragmentation of habitats affects habitat patch size, distribution, edge length, and corridors between patches, and can alter species composition. For instance, large predators such as tigers need large areas of habitat to survive, and, in contrast, invertebrates may only need small areas.

Therefore, the fragmentation of habitat into patches of varied distribution often has significant impacts on the survival of wildlife populations. This fragmentation can isolate populations from one another, stopping genetic flow and therefore weakening the genetic diversity of species. This can cause reduced fitness of a population (inbreeding depression) and can make the population more susceptible to the effects of disease and other external factors. An example is a small isolated population of African lions in Tanzania where, due to inbreeding depression, the males produced abnormal sperm which reduced reproductive success. Small isolated populations are particularly vulnerable to dramatic habitat alterations, where, for example, the complete burning of a habitat patch may cause the extinction of a species in that habitat. In both cases of inbreeding depression, and local extinction, wildlife managers may have to translocate individuals of species between habitat fragments.

Reduction in habitat patch sizes leads to the increased length of habitat edges. These are the zones between two or more plant communities. Many wildlife species make use of habitat edges. This is known as the 'edge effect'. Edge effect can be beneficial for some species when it provides access to two different habitats in a small area as there are greater resources available per unit of area. These edges can also have a negative impact on some species, particularly when there is a large edge bordering disturbed land. Forest fires, higher rates of predation and infestation by pioneer plant species are more likely to occur along the edges of habitat.

Corridors merge or connect other areas of habitat and enable wildlife movement between otherwise isolated areas. Wider corridors provide more vegetation and habitat structure and a greater potential for wildlife movement. Corridors work very well for certain migratory species such as larger herbivores and carnivores, and can be home to many smaller species of mammals and insects. However, these corridors can also have negative impacts on wildlife with some species facing increased susceptibility to predation, increased spread of diseases, weeds and pests and increased competition from other species.

Habitat Diversity

Habitat diversity includes both the diversity of species and of geographical and vegetative structure. Species diversity refers to the types of plants of varying family, genus and age in a habitat.

Geographic structure to geographic features such as elevations, and substrates ranging from soils, to river boulders, to rocky ridges and mountains. Structural diversity incorporates the vertical, horizontal and unique elements of the habitat. The loss of habitat diversity can have disastrous effects on wildlife, such as in Ireland, where it is estimated that 29 bird species and 120 flowering plants are in serious decline as a result of loss of diversity.

Arrangement

Arrangement is the provision and distribution of food, shelter and water within an animal's habitat. This arrangement will affect the way an animal uses its habitat. For example, populations of the arboreal koala (*Phascolarctos cinereus*) are more successful if their habitat is arranged in a mosaic pattern rather than in linear corridors.

Biological Control

Biological Control is defined as the reduction of pest populations by predators, pathogens, or competitors and typically involves an active human role. Biological control agents for insect pests, include predators, parasites and pathogens.

Integrated Pest Management

Integrated Pest Management is a pest control strategy that uses an array of complementary methods: natural predators and parasites, pest-resistant varieties, cultural practices, biological controls, various physical techniques, and pesticides as a last resort. It is an ecological approach that can significantly reduce or eliminate the use of pesticides.

SET TASK

Set Task 1

Contact an organisation involved in wildlife management such as a national park, wildlife reserve, zoo, etc. Ask about one of their wildlife management programs. You may include some of the following in your questions:

- Investigate the reasons for the particular program – is the population at risk? Is it due to an introduced species? Is it due to human interference?

- Try to determine the goals of the program – are they aiming to increase or reduce the population or just maintain the population of animals?

- What strategies have been implemented to achieve these goals? Are there any problems associated with implementing these strategies?

- Does the facility have the resources available to implement these strategies? Resources might include:

  a. Land

b. Resources – food, shelter, mates

c. Finances

d. Staffing

e. Community and government support ie volunteers, finances, resources

Set Task 2

In your locality, investigate one pest species of wildlife (e.g. mice, introduced insects, feral cats) and one endangered or threatened species (e.g. mammals, birds, fish, frogs) of native wildlife. Research what happened to make these animals pests or endangered.

For example, you might do some of the following;

- Contact a government department or organisation in your country or region that regulates the management of wildlife and detail their policies on this species.

- Ask questions that provide you with the social, political and economic contexts surrounding the animal in its present situation.

- Identify the natural environment that the species would naturally occupy.

- What is a sustainable population level for this species?

- What management strategies need to be implemented to reach and maintain this level?

- What implications are there for the animal if it encroaches on or enters a human use area?