Background Information and Species Management Guidelines for Namibia's Rare and Valuable Wildlife

Savanna Elephant

Loxodonta africana africana

Introduction

This booklet provides an overview of the savanna elephant in Namibia. It is part of a series of five booklets reviewing the conservation status and management guidelines of three large mammals and two groups of antelopes in Namibia. The other booklets are on hippopotamus, southern savanna buffalo, three large antelopes – roan antelope, sable antelope and tsessebe; and four water-associated grazing antelope – southern reedbuck, common waterbuck, red lechwe and puku.

These booklets summarise two technical reports *(Background Study* and *Management Plan)* prepared by Rowan Martin as part of the Transboundary Mammal Project of the Ministry of Environment and Tourism. The project was facilitated by The Namibia Nature Foundation and funded via WWF by the USAID Living in a Finite Environment (LIFE) Programme. Further information can be obtained from the technical reports. A series of five posters are also available for a quick overview of these issues.
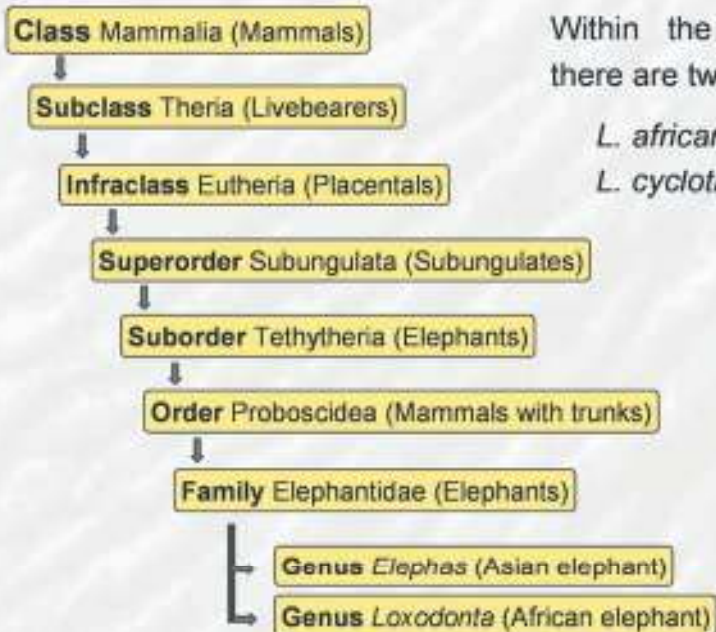
The conservation and management issues and ideas presented here are from a Namibian perspective; however, to fully achieve their aims, many of them require considerable co-operation and collaboration with neighbouring countries. Many of the management actions recommended for one species/group of species would have similar benefits to other rare or high value species.

Contents

Biology

Taxonomy

Class Mammalia (Mammals)

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Subclass Theria (Livebearers)

⬇

Infraclass Eutheria (Placentals)

⬇

Superorder Subungulata (Subungulates)

⬇

Suborder Tethytheria (Elephants)

⬇

Order Proboscidea (Mammals with trunks)

⬇

Family Elephantidae (Elephants)

Genus *Elephas* (Asian elephant)
Genus *Loxodonta* (African elephant)

Within the genus *Loxodonta*, there are two species:

L. africana Savanna elephant
L. cyclotis Forest elephant

Some early ancestors of modern elephants:

The Imperial Mammoth (*Mammuthus imperator*)
Pleistocene – 1.8 million years ago to recent times

Trilophodon
24 -1.8 million years

Moeritherium
34 - 15 million years

Platybelodon
12 - 5 million years

Savanna elephant

From *The New Encyclopedia of Mammals*, Ed. David Macdonald, Oxford University Press 2001

Physical Description and Behaviour

The Savanna Elephant is the largest land mammal with males weighing up to 7 tonnes. Namibia is famous for its "Desert Elephants" and they possess adaptations not seen in other savanna elephants; their larger body size is one such characteristic.

Typical measurements	Males	Females
Maximum body weight (kg)	7,000	4,000
Average adult body weight (kg)	5,000	3,500
Age to reach full adult weight (years)	30	25
Shoulder height for adults (m)	3.3	2.7
Weight of a calf at birth (kg)	100	

One criterion is more useful than all others to distinguish adult male and female elephants: only females have mammary glands.

The name *Loxodonta* derives from the lozenge-shaped teeth of the elephant. During its lifetime a sequence of 6 molars (M1-M6) erupt from the back of the jaw and move along the mandibles, wearing out as they go, until they fall out. The succession of molars allows fairly accurate ageing of animals.
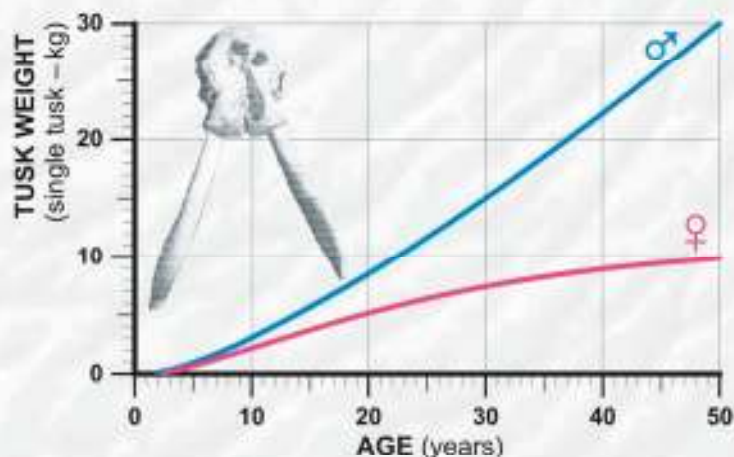
8cm

47cm

M6
47 years

Both males and females possess glands on their temples which secrete copiously irrespective of age, sex or season. This discharge is also one of the symptoms displayed by adult males in a musth condition; this occurs mainly during the rains and is linked to reproductive behaviour. Males may remain in musth for 2-3 months at a time.

Elephant tusks grow throughout their lifetime; the largest recorded pair in southern Africa weighed 64.3 and 64.8 kg. Namibian ivory from the western population has a reputation for being hard and brittle and broken tusks are common amongst the adult males there.

Herds are made up of related females and their young, directed by the oldest female, called the matriarch. Adolescent males usually leave the herd and live in small, loosely bonded groups; they move back into female herds only in search of cows in oestrous.

Elephants are capable of communications over long distances using infrasound inaudible to the human ear (14 – 20 Hz). Much of their communication is linked to females in oestrus but it also plays a rôle in relaying alarm messages and maintaining contact when groups are separated.

Elephants destroy crops, damage water installations, compete with cattle at water points and can be a physical threat to humans. The Caprivi has the highest incidence of human-elephant conflicts in Namibia; when these involve crop damage the effects on household livelihoods can be devastating. Incidents involving elephants are escalating.

Habitats

Elephants survive in a wide range of habitats across the extremes of rainfall in Africa – including desert conditions. Except for the harshest deserts, all of Namibia is suitable habitat for elephant. Even within the desert areas, elephants are able to make use of the watercourses almost as far as the coast and, following good rainfall, elephants may use areas below the 100 mm and 50 mm rainfall isohyets on an occasional basis.

When densities exceed one elephant to 3 km^2 in African savannas, loss of trees becomes starkly apparent. The concept that elephants may reach some equilibrium with their habitats has to be discredited.

Population densities increase, elephant destroy their habitats...

... and then crash

Elephants do not regulate their own numbers at levels which maintain savanna woodlands.

The relationship between elephants and their habitats may be cyclical. As elephant numbers build up, trees decline. This is followed by a decline in elephants; once they are at low densities, the trees increase, and the cycle repeats itself. Given the finite areas now available to elephants and high human populations in Africa, the troughs in the cycle are likely to result in local extinctions wherever elephants are unable to move away from their own 'mass destruction' or where there are no adjacent populations to repopulate the devastated area.

There is no simple recipe for management which will maintain biological diversity and, simultaneously, large populations of elephant.

Numbers and

The largest concentration of elephants in Africa occurs in a belt stretching across southern African between latitudes 13°S and 22°S. Within this area, **the joint populations of Botswana, Namibia, Zambia and Zimbabwe add up to over 200,000 elephants.** The rapid expansion of these populations is affecting biodiversity and human livelihoods. These elephants could provide the basis for creating a trans-frontier conservation area stretching from the east to the west coast of Africa.

Known range

The Namibian elephant population suffered a massive decline in the late 19th century due to extensive hunting for ivory. The last herd in the Etosha Pan area was exterminated in 1881 and by 1934 elephants were limited to the Kaokoveld and the Caprivi. Elephants re-appeared in Etosha in the 1950s.

The **north-western population** is increasing at about 3.3% per year and is now over **4,000** animals. The elephants in Etosha (2,500) are part of this population and move in and out of the National Park.

The **north-eastern population** now exceeds **18,000**. The recent increases are caused by immigration from northern Botswana and north-western Zimbabwe.
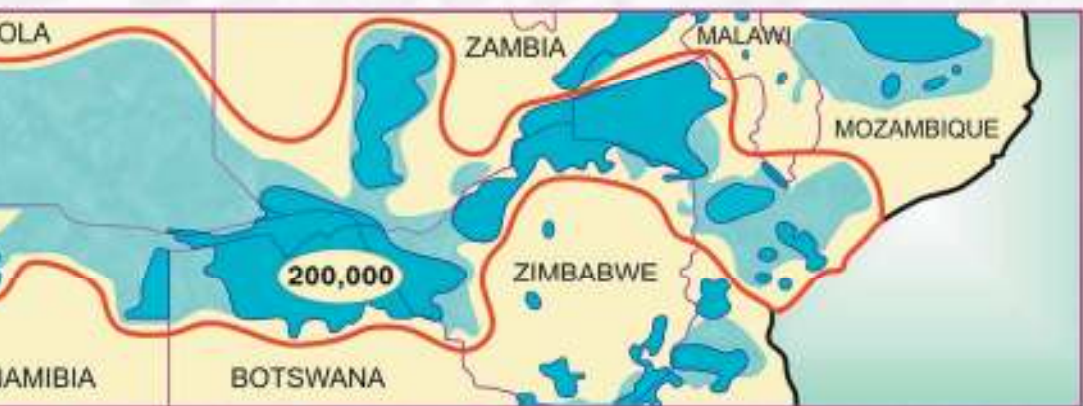
The total population in Namibia is now over 22,000 animals.

Elephants are having a marked impact on habitats, particularly in the north-east. Unless the permanent elephant range can be increased, vegetation damage and human-elephant conflict will escalate.
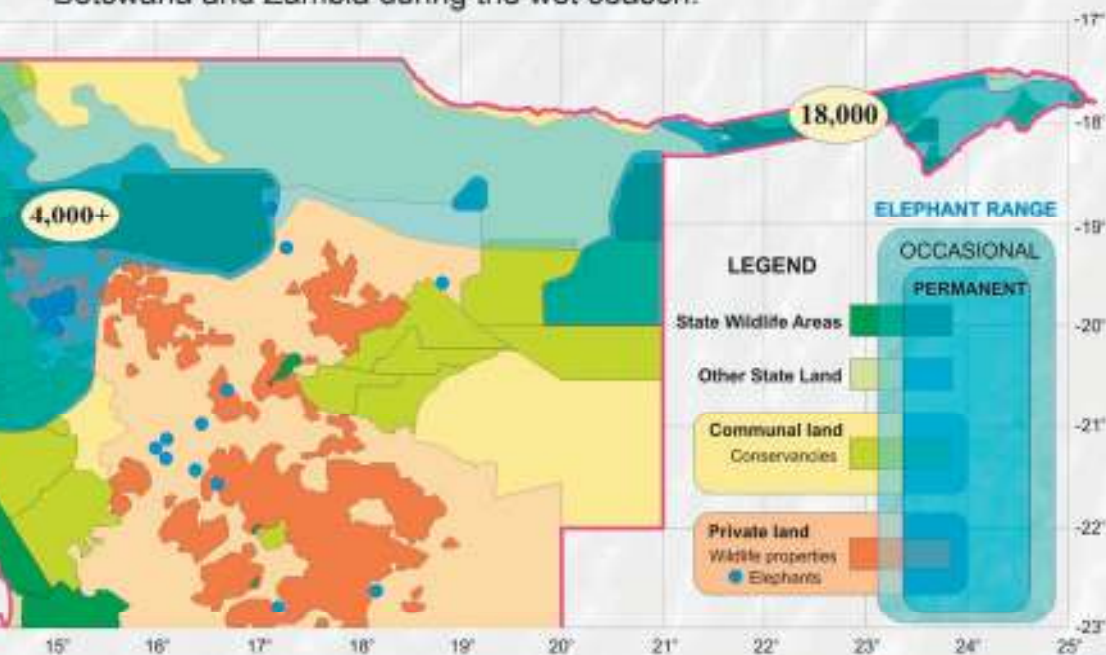
Distribution

▣ Occasional or possible range	⬭ **Potential transfrontier elephant populations**

Most elephants in the Caprivi move seasonally in and out of the area. Typically, they gather near rivers and permanent water holes during the dry season, moving away into neighbouring areas such as Angola, Botswana and Zambia during the wet season.

Reproduction and Population Dynamics

Longevity	Elephants are usually assumed to live to 60 years, but it is likely that few survive beyond 50 years
Gestation period	22 months
Seasonal breeding	Most populations have a breeding peak during the rains but births may occur in any month of the year
Age at first conception	The median age is about 10 years but in good conditions some cows may conceive as early as 8 years old
Breeding lifetime	Cows continue breeding throughout their lives
Fecundity	Cows can be expected to produce a calf every 4 years
Age-specific mortality	Mortality is about 10% for juveniles, decreasing to about 0.5% at 3 years old and remaining at 0.5% up to 45 years. Mortality then increases progressively as animals approach old age. Mortality in 20-25 year old males is higher than in females.
Sex ratio	Close to 1:1 in an unexploited population
Density dependence	Under environmental stress, mortality increases – affecting juveniles more than adults, age at first parturition may be delayed until as late as 19 years and fecundity may decrease to one calf every 6 years

With these reproductive parameters and a stable age structure, elephant populations will increase at 4.5% per year – a doubling time of about 16 years.
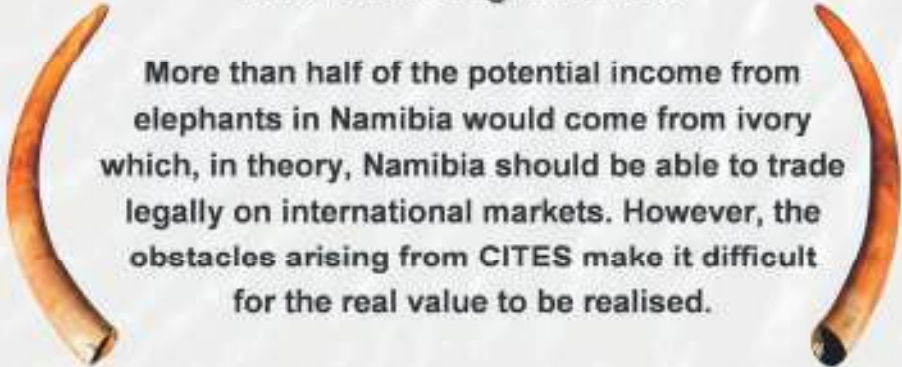
Significance

Conservation Significance

The African elephant is classified as "Threatened" in the Red Data Book of IUCN. In most of Africa, the elephant is listed on Appendix I of CITES* – implying that the species is on the brink of extinction and that any trade in its products could result in extinction.

However, Namibia's elephant populations were transferred to Appendix II of CITES in 1997, their conservation status is not of concern and no limiting factors prevent their increase. They are currently classified as a Specially Protected Species in Namibia. The elephant is regarded as a valuable species despite the fact that CITES currently makes it difficult to realise that value through legal trade in ivory, elephant skin and meat.

The short-term problem is to accommodate the increase in elephants happening at the moment. Namibia's Vision for its elephant population (page 11) may achieve this by converting areas of land to wildlife management. However, the long-term problem is that elephants increase beyond desired densities no matter how great the range available to them; population management, including reductions will be necessary.

*CITES = Convention on International Trade in Endangered Species of Wild Flora and Fauna

Economic Significance

More than half of the potential income from elephants in Namibia would come from ivory which, in theory, Namibia should be able to trade legally on international markets. However, the obstacles arising from CITES make it difficult for the real value to be realised.

The potential economic contribution of elephants to sustainable development in Namibia is high through –

Ecotourism: Net returns of US$5/ha or more are possible in prime areas but not over large tracts of land. The highest possible land use value for wildlife is derived from ecotourism operations which are based on domesticated elephants (US$500/ha).

Trophy Hunting: An elephant population at a density of $1/km^2$ with a quota of 0.5% of the total population gives a net return of about US$1.2/ha. Any significant level of problem animal control reduces this income.

Culling: The removal of 3% of the total population from breeding herds prevents population increase and gives a net return of about US$0.6/ha from ivory, meat and skin. Any illegal hunting reduces this income.
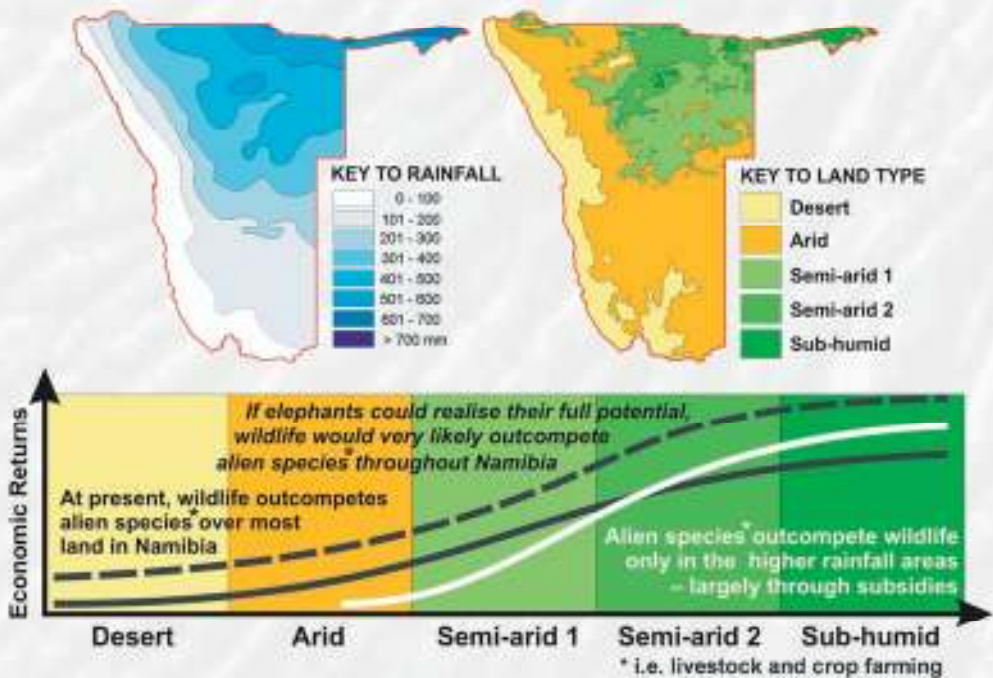
Comprehensive management: Trophy hunting quotas can be doubled when culling is taking place. The net return from culling and hunting is US$3/ha.

Safari hunting contributes 75% of the potential income.

Although the potential income appears high, when food consumption is taken into account, elephants are less valuable in safari hunting than many other species (for example, buffalo).

The highest valued land uses over most of Namibia are those based on management of natural resources. However, national and international policy constraints which place wildlife at a competitive disadvantage compared to land use based on exotic species (i.e. livestock and crop farming) are preventing elephants from being the vehicle to transform land use across northern Namibia. If subsidies were removed from the domestic livestock industry and elephants were able to play their full economic rôle in land use systems, large additional areas of land would probably be converted to wildlife management. This would remove the short-term limiting factor of providing additional range for elephant.

KEY TO RAINFALL
- 0 - 100
- 101 - 200
- 201 - 300
- 301 - 400
- 401 - 500
- 501 - 600
- 601 - 700
- > 700 mm

KEY TO LAND TYPE
- Desert
- Arid
- Semi-arid 1
- Semi-arid 2
- Sub-humid

Economic Returns

If elephants could realise their full potential, wildlife would very likely outcompete alien species throughout Namibia*

At present, wildlife outcompetes alien species* over most land in Namibia

Alien species* outcompete wildlife only in the higher rainfall areas – largely through subsidies

Desert   Arid   Semi-arid 1   Semi-arid 2   Sub-humid

* i.e. livestock and crop farming

NAMIBIA'S VISION

To seek to expand the elephant range and enhance the rôle of wildlife as a land use by promoting linkages and co-management between State Protected Areas and Conservancies on communal and private land.

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Stakeholders

Rightly or wrongly, throughout the world people feel they are stakeholders in conserving the African elephant.

However, the primary conservation needs of the elephant are a secure range and protection from illegal hunting. These can only be provided by the **primary stakeholders** – the Namibian government and landholders of both communal and private land. The idea that protection can be achieved by banning commercial trade in ivory at the global level is debatable. The primary stakeholders must regain control over elephants.

The requirements of elephants dictate co-management. No tract of land in Namibia is large enough to be a self-contained management unit for elephant. Co-management presents a new challenge which will require further devolution of powers to landholders.
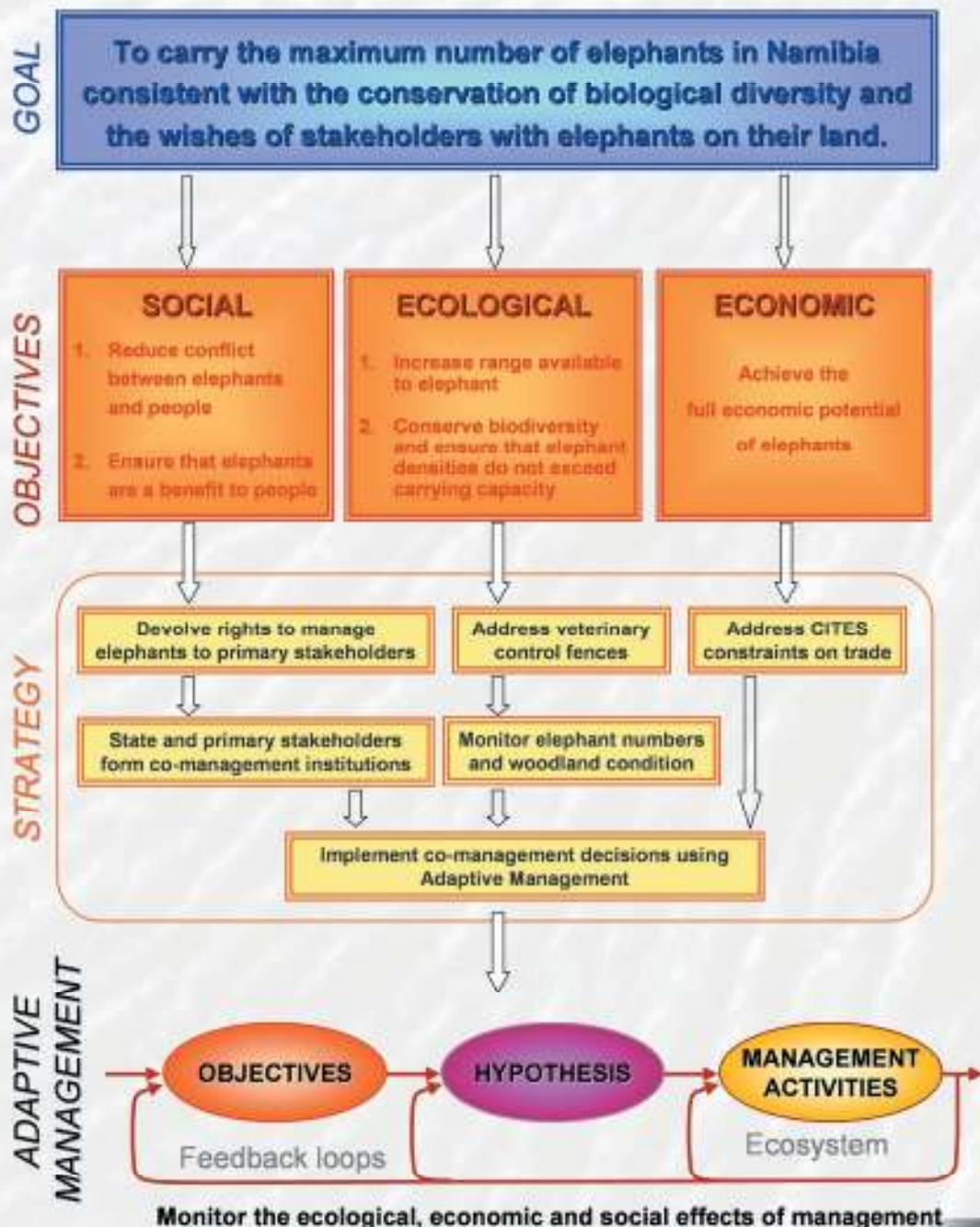
Private land

Communal land

State land

Namibia has been successful in the development of an impressive wildlife industry and already enjoys co-operation between the State, private sector, community-based organisations and NGOs.

Namibia may lead southern Africa in developing much needed institutions for co-management. The Mudumu North Complex in the Caprivi – an area which includes national parks, State forest and conservancies – may be the first step along this path.

**This is consistent with Namibia's VISION statement.**

Management

GOAL

To carry the maximum number of elephants in Namibia consistent with the conservation of biological diversity and the wishes of stakeholders with elephants on their land.

OBJECTIVES

SOCIAL
1. Reduce conflict between elephants and people
2. Ensure that elephants are a benefit to people

ECOLOGICAL
1. Increase range available to elephant
2. Conserve biodiversity and ensure that elephant densities do not exceed carrying capacity

ECONOMIC
Achieve the full economic potential of elephants

STRATEGY

Devolve rights to manage elephants to primary stakeholders

Address veterinary control fences

Address CITES constraints on trade

State and primary stakeholders form co-management institutions

Monitor elephant numbers and woodland condition

Implement co-management decisions using Adaptive Management

ADAPTIVE MANAGEMENT

OBJECTIVES → HYPOTHESIS → MANAGEMENT ACTIVITIES →

Feedback loops

Ecosystem

Monitor the ecological, economic and social effects of management

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Effects of Management

A population which is not utilised increases at about 5% per year and has the age structure shown below.
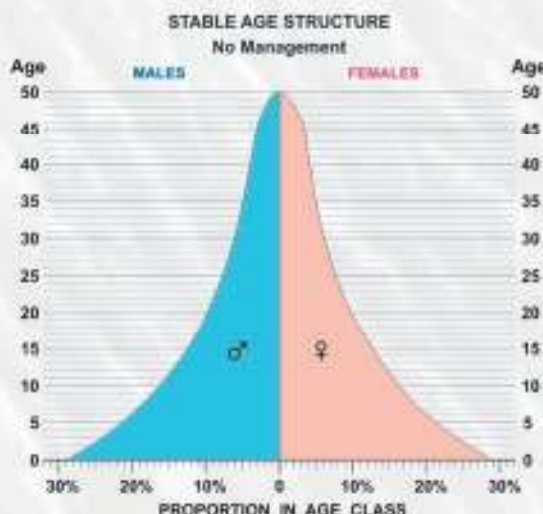
Any selective pressure changes the age structure:

Illegal hunting for meat where animals are killed at random does not alter the age structure and affects only the rate of increase of the population.
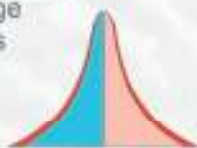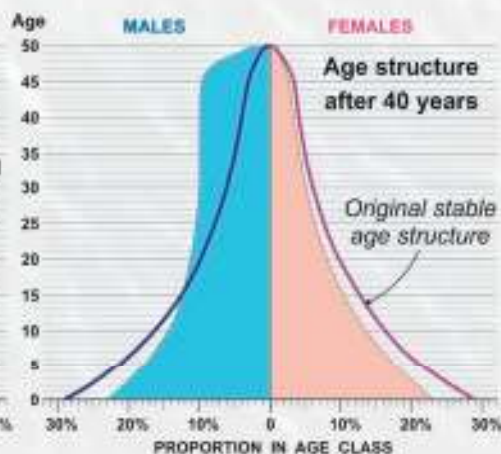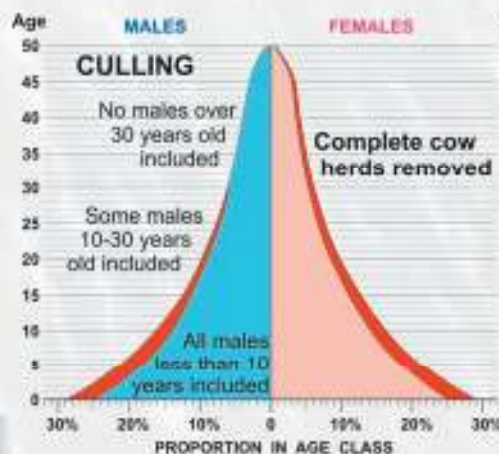
Problem Animal Control mainly affects males over 14 years old and reduces the number of hunting trophies available.

Trophy Hunting includes males older than 29 with a selective pressure on the oldest.

STABLE AGE STRUCTURE
No Management

Age — MALES — FEMALES — Age

♂ ♀

PROPORTION IN AGE CLASS

Annual removal of cow herds totaling about 3% of the population prevents population increase. The age structure alters to produce a large number of males over 15 years old which greatly increases hunting quotas.

Age — MALES — FEMALES

CULLING

No males over 30 years old included

Complete cow herds removed

Some males 10-30 years old included

All males less than 10 years included

PROPORTION IN AGE CLASS

Age — MALES — FEMALES

Age structure after 40 years

Original stable age structure

PROPORTION IN AGE CLASS

The levels of the different types of offtake need to be quantified and considered when setting population management targets.

In the absence of any other management (including Problem Animal Control - PAC), the proportion of an elephant population which can be hunted for trophies is about 0.5%. These trophies would all be males over 30 years old. To achieve a mean tusk weight of 20 kg, trophy hunting quotas should be set at **0.45%** with no culling or **1.15%** if a culling regime is in place. When the Problem Animal Control offtake rises to 0.5%, the hunting quota must be reduced to 0.2% of the population if there is no culling but can be maintained at 0.8% with an ongoing 3% cull.

If problem animal control is restricted mostly to male elephants 15 years and older, the maximum sustainable offtake is about 1.5% of the total population. As the problem animal offtake is increased the trophy hunting quota must be reduced to remain sustainable and when the level of PAC reaches 1.5% there are insufficient animals reaching an age of 30 years to allow sport hunting. The combined effects of PAC and illegal hunting on net land use values of an elephant population managed at a density of **0.5/km²** are shown here.

Values exceed **US$2/ha** for low levels of PAC and illegal hunting. However, returns fall below **US$0.5/ha** if PAC exceeds 1% and illegal hunting reaches 2.5%. Illegal hunting replaces culling when it reaches **4%**. When PAC reaches **1.5%** trophy hunting becomes unsustainable.
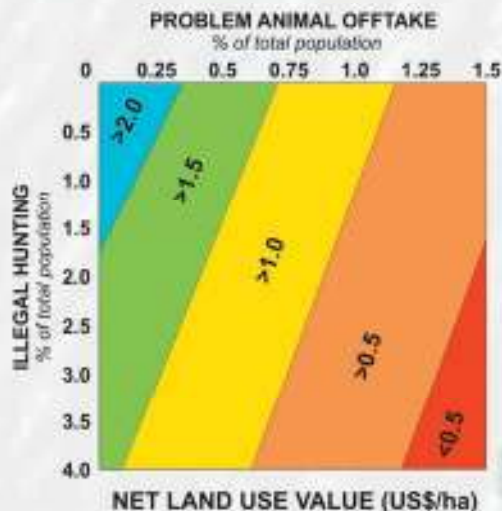
Recommended Management

According to Namibia's **Vision Statement** for its elephant population, decisions should be taken jointly by all stakeholders with elephants on their land, taking account of the following:

❶ In the **north-west**, the elephant population can be allowed to continue expanding its present range and management can be limited to trophy hunting.

❷ In the **north-east**, the elephant density should not exceed $0.5/km^2$. The present population of some 18,000 should be reduced to **12,000** and maintained at that level with an **annual cull** of 3% of the total population. Trophy hunting should be managed to achieve an average tusk weight of at least 20 kg.

❸ Throughout the elephant range, management should be aimed at **reducing problem animal control** and **illegal hunting**. These result in huge financial losses to the stakeholders.

❹ It would be highly desirable for the countries sharing the elephant range to **develop a common management approach** for elephants. Without such an agreement, Namibia must manage its elephants in the best interests of the Namibian people and its concerns for the conservation of biological diversity.

These management guidelines differ from those for other species in that very little funding is required to implement them. The main costs lie in co-ordination and implementation of management activities that arise from co-management decisions. The potential income from elephant management is substantial and should more than cover these costs. Even if the full value of ivory and elephant skin is not achieved, the revenue from tourism and sport hunting will provide some 75% of the amounts required. Another feature of these management guidelines is just how few actions are needed to bring them to fruition.

There is little risk that any management interventions could have an adverse effect on the status of elephant populations in Namibia. Given the escalating human-elephant conflict and the extreme modification of habitats in north-eastern Namibia, the greatest risk in government's position is to do nothing.

This series of booklets provides an overview of 5 groups of species:

Southern Savanna Buffalo *Syncerus caffer caffer*

Savanna Elephant *Loxodonta africana africana*

Hippopotamus *Hippopotamus amphibius*

Roan Antelope *Hippotragus equinus*
Sable Antelope *Hippotragus niger niger*
Tsessebe *Damaliscus lunatus lunatus*

Southern Reedbuck *Redunca arundinum arundinum*
Common Waterbuck *Kobus ellipsiprymnus ellipsiprymnus*
Red Lechwe *Kobus leche leche*
Puku *Kobus vardoni*

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USAID
FROM THE AMERICAN PEOPLE

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