

## CHAPTER 3

# RARITY AND NATURE CONSERVATION

### CHAPTER OUTLINE

- |            |                                   |            |  |
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| <b>3.1</b> | <b>What do we mean by rarity?</b> | <b>3.4</b> | <b>Legal protection for rare species</b> |
| <b>3.2</b> | <b>Different forms of rarity</b>  | <b>3.5</b> | <b>Summary</b>                           |
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### 3.1 WHAT DO WE MEAN BY RARITY?

A **rare** species is one whose total population is comprised of relatively few individuals. Rarity can be considered at various levels, such as local, national and global. In general, species which are globally rare are worthy of greater conservation effort than those that are only locally rare but common elsewhere.

Why is it that conservationists are so often concerned with rare species? The argument is that, because of all the human-induced changes that are going on all around us, rare species may need some special protection if they are to survive in the long-term. Furthermore, if we look after rare species, commoner species will also benefit and will be better able to look after themselves.

### 3.2 DIFFERENT FORMS OF RARITY

Species may be rare for various reasons, some of them **natural**, and others **human-induced**. It is important to make this distinction between natural rarity and human-induced rarity, because the approaches to conservation may be very different.

(1981) based on a consideration of three criteria: geographic distribution, habitat specificity and local population size. Examples of how this classification might work for Ugandan species are given in Table 3.1.

#### 3.2.1 Natural rarity

In any ecosystem, such as a tropical forest, some species are naturally rarer than others. For example, predators are normally rarer than their prey, and species that require certain precise habitat conditions that are themselves rare, or species with narrow ecological niches ("specialists") will also usually be rarer than species with more catholic requirements or broader ecological niches ("generalists") (section 5.5.2). Rarity is a subjective measurement, however, and different people use it in different ways. Some use it as one end of a spectrum of abundance, which goes from describing species as dominant, through abundant, then frequent, then occasional, to rare. This is the so-called "DAFOR" scale of abundance, much used by plant ecologists.

Conservation of species that are naturally rare should be straightforward: as long as the ecosystem where a naturally rare species lives is left untouched by humans, no further conservation action should be necessary to ensure its survival. Problems arise where a naturally rare species is further threatened by human activities, in which case conservation can be much more difficult.

#### 3.2.2 Human-induced rarity

These days, there are very many species which are rare because of human activities. Some of these species were once common, while others would always have been rare and have been made more so by human activity. It is also likely that many species are commoner today because of human activities, including some that may once have been rare. From a conservation point of view, though, we are more concerned about species in the former group that may be driven to extinction by our activities if we do not take steps to conserve them.

An alternative approach is simply to divide species into "common" and "rare". A classification along these lines has been developed by Rabinowitz

**Table 3.1.**  
**A three-way classification of natural rarity, with Ugandan examples. After Rabinowitz (1981).**

Geographic distribution	Habitat specificity	Local population size	Status	Ugandan example
Wide	Broad	Somewhere large	Common	<b>Baboon</b> ( <i>found throughout sub-Saharan Africa, in all sorts of habitats from closed forest to semi-desert, and often in large numbers</i> ).
Wide	Broad	Everywhere small	Rare	<b>Leopard</b> ( <i>found throughout sub-Saharan Africa, in all sorts of habitats from closed forest to savannah, but always in very low numbers</i> )
Wide	Restricted	Somewhere large	Rare	<b>Crowned crane</b> ( <i>widespread in southern and central Africa, but largely confined to swampy grasslands, where it can sometimes be found in large numbers</i> )
Wide	Restricted	Everywhere small	Rare	<b>African giant swallowtail</b> ( <i>a butterfly found throughout the Guineo-Congolian forest zone, but probably only in unlogged mature or riverine forest, and always in very small numbers</i> ).
Narrow	Broad	Somewhere large	Rare	<b>Scarce swift</b> ( <i>a bird restricted to the highlands of East Africa, feeding on the wing over a wide range of habitats. Breeds in colonies</i> ).
Narrow	Broad	Everywhere small	Rare	<b>Taita falcon</b> ( <i>a bird restricted to East Africa, breeding in small numbers on rocky crags in a variety of different environments</i> ).
Narrow	Restricted	Somewhere large	Rare	<b>Grauer's rush warbler</b> ( <i>a bird confined to south-west Uganda and neighbouring parts of Zaire and Rwanda, and restricted to montane swamps, where it can be one of the most numerous bird species</i> ).
Narrow	Restricted	Everywhere small	Rare	<b>Mountain gorilla</b> ( <i>confined to south-west Uganda and neighbouring parts of Zaire and Rwanda, and restricted to montane forests, where it occurs at very low densities</i> ).

There are certain characteristics that might make some animal or plant species more vulnerable to humans than others. We could speculate that the animal most likely to become rare because of human activities would have the following characteristics:

- it would be large
- it would be a predator
- it would have narrow habitat tolerance
- it would naturally have a restricted distribution
- it would have valuable skin
- it would be subjected to uncontrolled hunting
- it would migrate across international boundaries
- it would be intolerant of the presence of man
- it would breed only in large herds
- it would reproduce slowly
- its behaviour would be repellent to humans

Probably no such animal species exists, but many species exist that have some of these characteristics, and these are usually the ones that become rare through the activities of humans. Even just one such characteristic can be enough to make a species vulnerable to human activities.

Table 3.2 examines each characteristic in turn, giving examples of species that occur in Uganda, along with examples of species that have corresponding characteristics that make them relatively invulnerable to human activities. Note that the list is by no means exhaustive, and that the table refers to animals only. A similar table could be constructed for plants, although the choice of characteristics would be a little different. Some of the characteristics that would make a plant species particularly vulnerable to human activities are shown on page 20.

**Table 3.2.**  
**Characteristics of animal species that determine whether they are at risk or**  
**invulnerable to human activities. Adapted from Deshmukh (1986)**

Characteristics of high-risk	Ugandan example	Corresponding characteristics of lower-risk species	Ugandan example	Comments
Individuals of large size	<i>Python</i>	Individuals of small size	<i>Rat-snake</i>	Large species may be seen as more of a threat to humans than smaller ones, or they may simply require larger areas of habitat than smaller ones. Pythons are probably killed more often than rat-snakes because they are large and obvious whereas rat-snakes are smaller and therefore appear less dangerous to humans.
Predator	<i>Crowned eagle</i>	Non-predator	<i>Marabou stork</i>	The top predators are normally the first to suffer when humans appear on the scene, either because they are seen as a direct threat to or competitor with humans, or because they need large areas to ensure adequate supplies of their prey. Crowned eagles only survive where there are large areas of forest, as smaller areas will not support enough prey species (monkeys) to maintain a viable population. Hence they suffer if forests are fragmented. Marabou storks, on the other hand, survive very well alongside humans because they scavenge his waste.
Narrow habitat tolerance	<i>Grauer's rush warbler</i>	Broad habitat tolerance	<i>African reed warbler</i>	Specialists will survive as long as their specific habitat continues to exist, but cannot adapt to or fall back on other habitats if their specific habitat disappears through human activity. Thus Grauer's rush warbler, confined to montane swamps, cannot survive if the swamp is drained or cultivated, whereas the African reed warbler is found in various sorts of swampy vegetation as well as in scrub and gardens.
Valuable for skin etc.	<i>Leopard</i>	Not valuable for skin etc.	<i>Lion</i>	Killing a species for its skin puts extra pressure on the population that species without valuable skin do not face. Thus leopards, which are naturally rare anyway, can easily be driven to extinction by the fur trade, whereas lions, which are also naturally rare, are not.
Illegal, uncontrolled hunting	<i>Black rhino</i>	Legal, controlled hunting	<i>Uganda kob</i>	Many species can be harvested sustainably, but if harvesting is not controlled then the species may be at risk. Many timber trees fall into this category, as does the black rhino, which is now extinct in Uganda. Uganda kob, on the other hand, are legally hunted in Kyambura Game Reserve (injured individuals only) yet they remain common there.
Restricted distribution	<i>Mountain gorilla</i>	Broad distribution	<i>Baboon</i>	A species is more at risk if it is only found in a small area, because if that area is destroyed then the species will vanish too. Thus mountain gorillas are at risk because they are only found in a tiny area of central Africa, whereas baboons are not because they are found throughout much of the continent.
Migrates across international boundaries	<i>Sand martin</i>	Populations remain within one country	<i>African sand martin</i>	A species may be protected in one country but unprotected in others through which it migrates. Alternatively, its breeding areas may be secure but its non-breeding range less so. Thus the sand martin, a bird which breeds in Europe but spends the non-breeding period in tropical Africa, has suffered from desertification in the Sahel over which it must pass. The African sand martin, however, stays in tropical Africa year-round and does not have to cross the Sahel.
Intolerant of the presence of humans	<i>Giant forest hog</i>	Tolerant of humans	<i>Bush-pig</i>	Some species shun contact with humans, or are easily hunted by them. Thus giant forest hogs tend not to be found in forests with high human populations around them, whereas bush-pigs may even increase if the surrounding land is cultivated as they take advantage of the new food-source and manage to avoid being hunted.
Breeds in large herds or flocks	<i>Elephant</i>	Breeds as solitary pairs or small groups	<i>Bush-buck</i>	Some species need to form groups for successful survival. Thus, if a herd of elephants is reduced by humans to a few individuals, they may no longer breed and will eventually die out, whereas it only takes two bush-buck to found a new population.
Slow reproductive rate	<i>Chimpanzee</i>	Fast reproductive rate	<i>Black-and-white colobus</i>	If a species is a slow breeder, then populations will take a long time to recover from reductions caused by humans. Before then, they may have been driven to extinction. Thus chimpanzees, which produce one offspring every few years, are more at risk than black-and-white colobus, which may produce more than one offspring per year.
Behaviour repellent to many human societies	<i>Chameleon</i>	Behaviour well-adapted to living alongside humans	<i>Gecko</i>	Some species are persecuted simply because humans find them repellent. Thus chameleons are often killed because they are supposedly evil or poisonous (they are actually harmless), whereas geckos are welcomed in many homes because they eat insects.

- it would be slow-growing
- it would have narrow habitat tolerance
- it would have valuable wood, bark, seeds or other body parts
- it would be subjected to uncontrolled harvesting
- it would naturally have a restricted distribution
- it would be subject to international trade
- it would be intolerant of disturbance, fire or grazing
- it would be gregarious and monoecious
- it would reproduce slowly
- it would be poisonous or thought to harbour evil spirits

Again, probably no such plant exists, but it is useful to think of plants this way as it helps us to understand why some are more vulnerable to human activities than others.

### 3.2.3 Conservation implications of rarity

Because there are many different reasons why a species might be rare, it follows that there is no one conservation method that will work for all species, so if we want to succeed in conservation, we have to be flexible in our approach. Usually, the best method is to provide the species with an area where it can exist without human interference (*in-situ conservation*), but sometimes this is not possible or even not necessary. Sometimes law enforcement, or a change in the law, or a change in public attitudes is required; sometimes we still do not know what is best for the species in question, in which case more research or monitoring is required; and sometimes, the only hope is to keep the species in a zoo, botanic garden or seed bank (*ex-situ conservation*).

## 3.3 THREATENED SPECIES

### 3.3.1 Extinction

We have seen that species may be rare for natural or human-induced reasons, but conservationists are most concerned about those that are under threat of suffering further decreases through human activities, possibly to the point of extinction. There are plenty of them, and extinction rates seem to be increasing all the time. Of course, extinction can be an entirely natural process. If it was not, then we would be sharing the planet with dinosaurs and mammoths. As new species evolve, so others go extinct. This natural, background rate of

extinction is today estimated at one species per year. But on top of this we now have human-induced extinctions, at a rate of 100s or 1000s per year. (Wilson, 1988). By the end of the century, the rate may reach one species lost per hour. A typical suggestion from the experts is that 2.8 % of all species on earth may be driven to extinction within the next 25 years (Hamilton, 1993). Most extinctions probably go unnoticed, because they mostly occur amongst the lower plants and invertebrates. But even for well-known groups such as birds (Figure 3.1), far more species are becoming extinct nowadays than ever before.

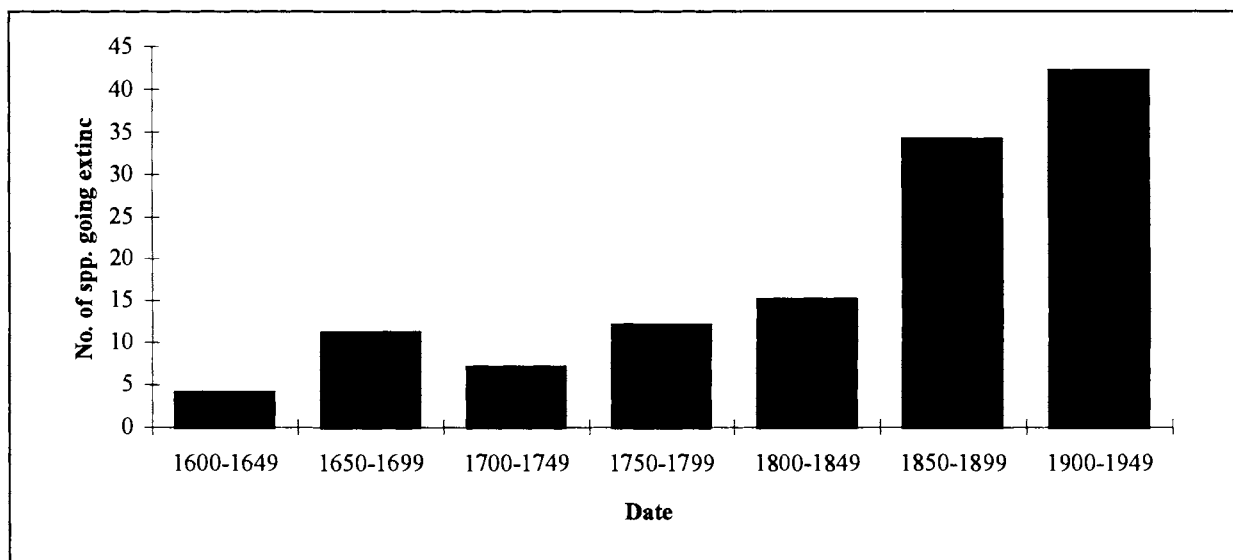


Figure 3.1. Global extinction rates for birds over the past four centuries. The data only extend to 1949, but the rate of loss since then is likely to be even higher. After WCMC (1992).

### 3.3.2 Categorising the degree of threat

Some species are more threatened than others. In order to prioritise conservation effort, an internationally accepted series of categories has been devised by IUCN, to cover all species recognised as being internationally threatened. These are listed in Box 3.1. The categories are based on several criteria that, when taken together, indicate to what extent a species (or other taxon such as sub-species or race) is threatened with extinction. The criteria that IUCN has chosen include the degree to which the taxon is showing a decline, and whether it has a small range and fragmented, declining or fluctuating populations. Note that the general term *threatened* is used to refer to a species considered to belong to any one of the categories. This set of categories replaces an earlier one also devised by IUCN, which is still in wide use amongst conservationists as well as planners and law-makers.

It is important to remember that we do not know the status of most of the world's plants and animals. Those that are recognised are mostly from well-known groups of plants or animals (such as the African elephant, figure 3.2, whose recent decline is all too evident), but they probably represent just a small fraction of the true number of threatened species worldwide.

IUCN has developed a series of *Red Data Books* for the more prominent groups, which give accounts of all species and other taxa designated as being internationally threatened. These books may be based on a certain taxonomic group (such as primates), or on a particular region. By 1991, 4589 threatened animal species were officially listed, including 555 mammals, 1073 birds, 186 reptiles, 596 fishes and over 2000 invertebrates (WWF, 1991b); the figure for plants is about 60,000. In each case the number is rising all the time; the current proportion of species that fulfil the criteria for listing is probably about 10%.

**Box 3.1.**  
**IUCN Threatened Species categories (from Collar, Crosby and Stettersfield, 1994)**

**EXTINCT:** A taxon is extinct when there is no reasonable doubt that its last individual has died.

**EXTINCT IN THE WILD:** A taxon is extinct in the wild when it is known only to survive in cultivation, in captivity, or as a naturalised population well outside the past range.

**CRITICALLY ENDANGERED:** A taxon is critically endangered when it is facing an extremely high risk of extinction in the wild in the near future.

**ENDANGERED:** A taxon is endangered when it is not critical but is facing a very high risk of extinction in the wild in the near future.

**VULNERABLE:** A taxon is vulnerable when it is not critical or endangered but is facing a high risk of extinction in the wild in the medium-term future.

**CONSERVATION DEPENDENT:** Taxa which do not currently qualify as critical, endangered or vulnerable may be classified as conservation dependent. To be considered so, a taxon must be the focus of a continuing conservation programme which directly affects the taxon in question. The cessation of this programme would result in the taxon qualifying for one of the threatened categories above.

**LOW RISK:** A taxon is low risk when it has been evaluated and does not qualify for any of the categories critical, endangered, vulnerable, conservation dependent or data deficient. This category will include those that are close to qualifying for the threatened categories, those that are of less concern, and those that are presently abundant and unlikely to face extinction in the foreseeable future.

**DATA DEFICIENT:** A taxon is data deficient when there is inadequate information to make an assessment of its risk of extinction based on its distribution and/or population status. Listing in the category indicates that more information is required, and acknowledges the possibility that future research will show that threatened classification is inappropriate.

**NOT EVALUATED:** A taxon is not evaluated when it has not yet been assessed against the criteria.

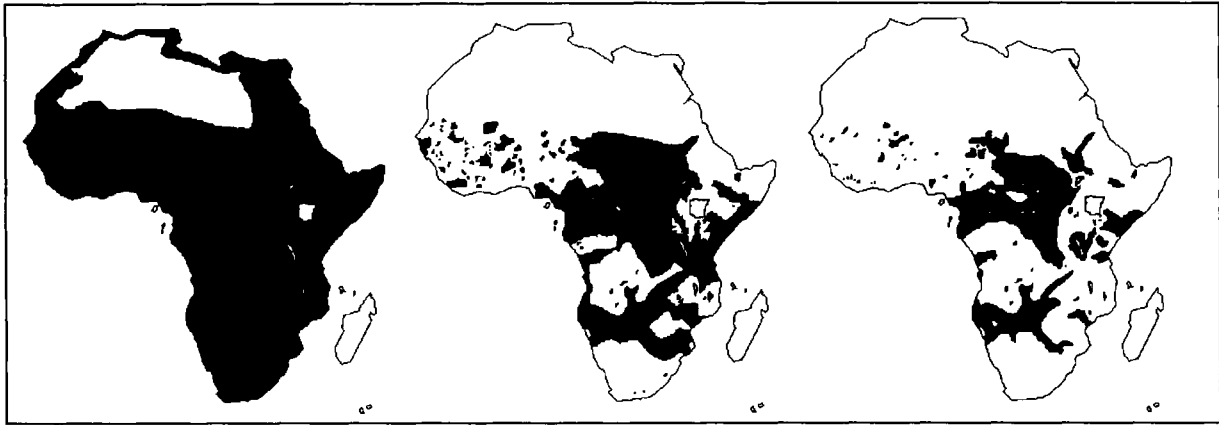


Figure 3.2. The decline in the range of the African elephant. Left: historical range. Centre: 1970s range. Right: 1980s range. After Chadwick (1991).

### 3.3.3 What are the main human-induced threats to species?

We have already seen why some species are more at risk than others. In general, three broad categories of human activities account for most of the threats world-wide:

- habitat destruction (through expanding agriculture, forestry and urbanisation);
- direct exploitation (for instance hunting and logging); and
- introduction of exotic species (acting as either competitors with or predators on native species).

Figures 3.3 and 3.4 illustrate this, based on analyses of the world's threatened mammal species (WCMC, 1992) and threatened "restricted range" bird species (Bibby et. al, 1992). Habitat destruction comes out as the clear leader in both analyses.

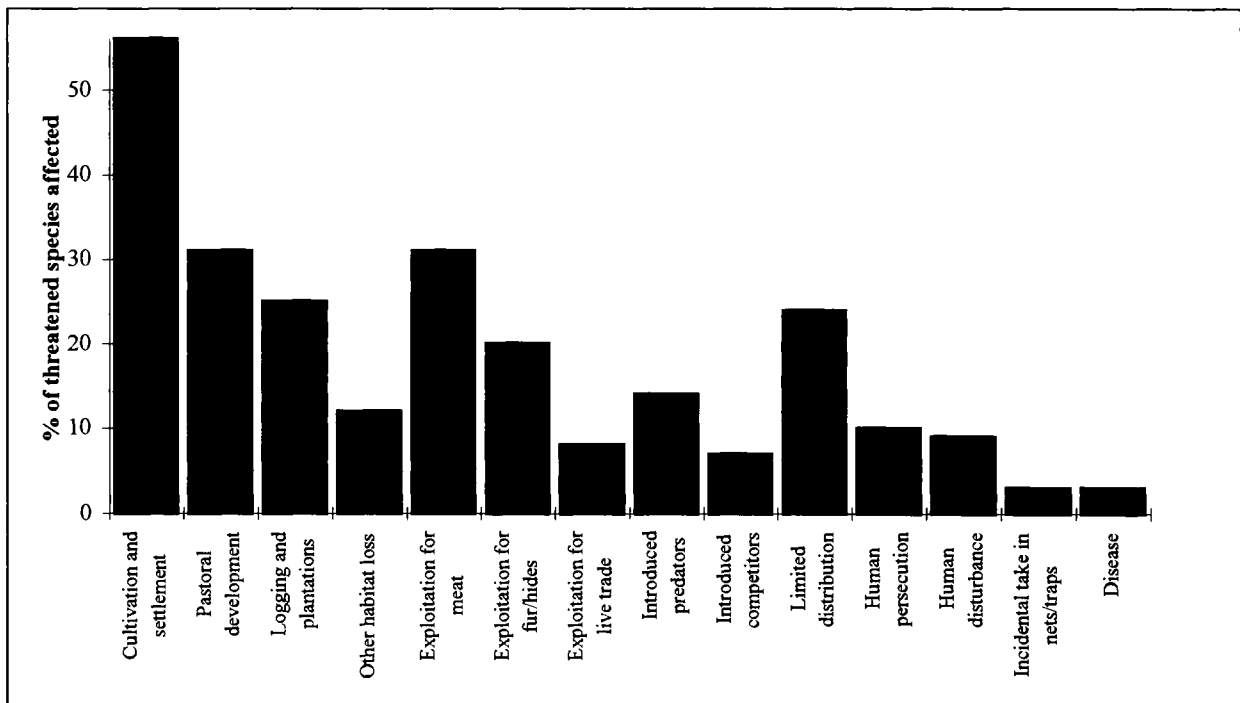


Figure 3.3. The main threats to threatened mammal species. After WCMC (1992).

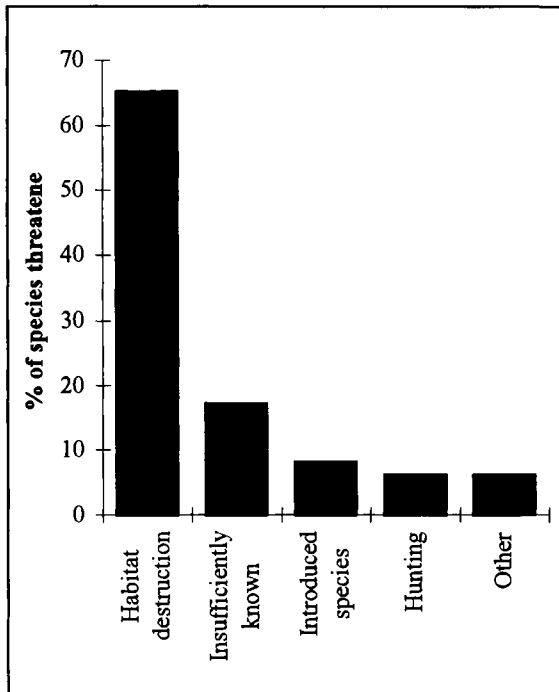


Figure 3.4. The main threats to threatened "restricted range" bird species. After Bibby et al. (1992).

### 3.3.4 Threatened species and the tropical forests

Having seen what makes some species rare, and what threats species face, it is worth considering the global distribution of threatened species. As Figure 3.5 suggests, more threatened species (at least amongst the birds and mammals) are natural inhabitants of tropical forest than of any other ecosystem. This provides strong support for the idea that conservation of the world's tropical forests is one of the most important goals in conservation today, and that managers of tropical forests therefore bear a large part of the responsibility for ensuring the survival of many of the world's most threatened species.

### 3.3.5 Threatened species in Uganda

Several of IUCN's Red Data Books contain species found in Uganda; see for example Sayer, Harcourt and Collins (1992), IUCN (1988), Stuart and Adams (1990), Collar and Stuart (1985b), Collins and Morris (1985), Lee et al. (1988) and WCMC (1990). Altogether, there are 11 plants, 16 mammals, 12 birds and one reptile in Uganda that are considered internationally threatened (WCMC, 1992). Some of those species which occur in forest reserves or forests are described in box 3.2. Also included are some timber trees listed by FAO

(1986) and ITTO (1991a) as internationally threatened - see also Table 3.3. Note that these species are listed under the earlier set of IUCN criteria for threatened species, which divided species into five threatened categories, as shown in the list.

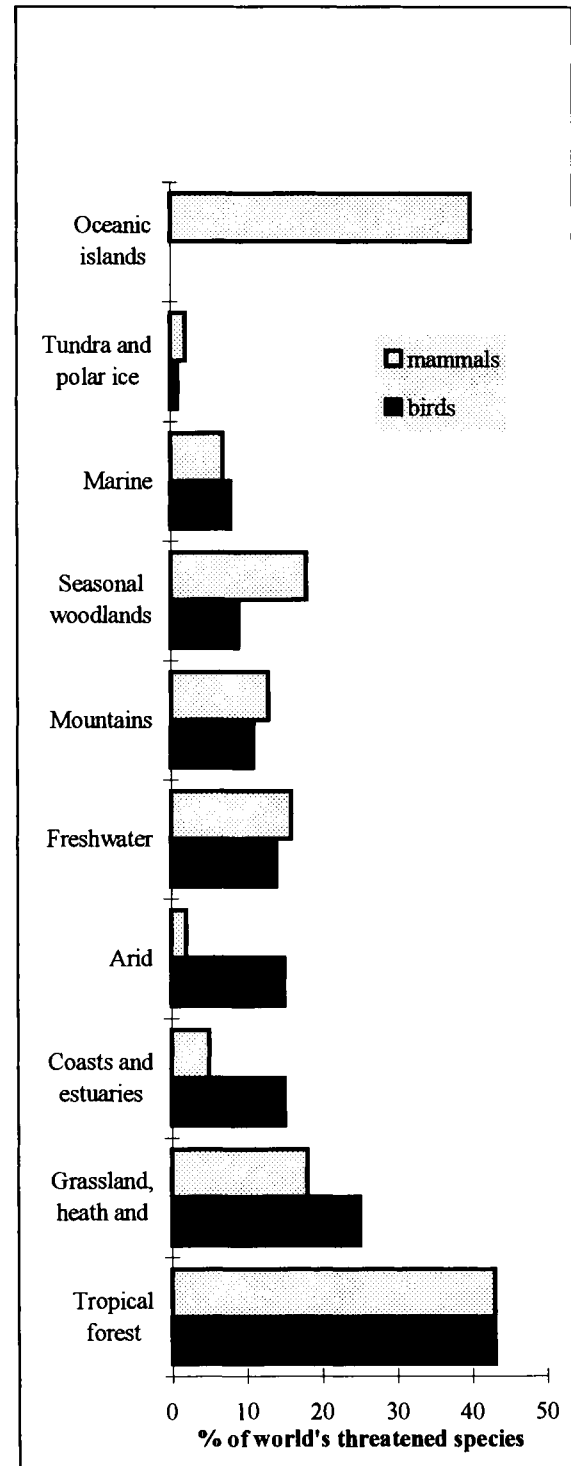


Figure 3.5. The distribution of the world's threatened birds and mammals by ecosystem type. After WCMC (1992).

**Box 3.2.**

**Threatened species that occur in Uganda.** The species are listed in decreasing order of likelihood of extinction, according to a previous set of IUCN threatened species criteria to that currently in use.

**Extinct species**

There are no known species that are now internationally extinct and which used to occur in Uganda. (There are, of course, several species that are now extinct in Uganda but not yet internationally).

**Endangered species or races**

- **Mountain gorilla (*Gorilla gorilla berengei*).** In Uganda, it occurs only in Bwindi and Mgahinga; elsewhere only in adjacent parts of Zaire and Rwanda, in montane forest (FFPS, 1994). Probably fewer than 600 remain, which sounds quite a few until it is remembered that it is about the same number as there are humans in just 2 km<sup>2</sup> of adjacent farmland. Threatened by forest loss, pit sawing and poaching.
- **Rwenzori black-fronted duiker (*Cephalophus nigrifrons rubidus*).** A race known only from the montane forests of the Rwenzoris in Uganda and Zaire. Threatened by hunting and habitat loss.
- **Golden monkey (*Cercopithecus mitis kandii*).** In Uganda, this race occurs in montane forest in the Virungas. Elsewhere, probably found in similar forests in eastern Zaire and Rwanda. Threatened by forest loss and perhaps hunting. [N.B. category under revision: may not yet have been placed in endangered category].
- ***Haplochromis* and *Tilapia* spp.** Over 250 species of cichlid fishes which are known only from Lake Victoria, threatened primarily by predation by the introduced Nile Perch.

**Vulnerable species**

- **Chimpanzee (*Pan troglodytes*).** In Uganda, it occurs in several western forests; elsewhere found in the forests of west and central Africa. Probably 50-200,000 remaining (WWF, 1991b). Threatened by forest loss, human disturbance and live trade.
- **L'hoest's monkey (*Cercopithecus l'hoesti*).** In Uganda, occurs in a few south-western forests; elsewhere found in lower montane forests in the Albertine Rift and in a small area of west Central Africa. Threatened by forest loss and hunting.
- **Uganda red colobus monkey (*Procolobus badius tephrosceles*).** In Uganda, this race occurs only in Kibale forest. Elsewhere, it occurs in western Tanzania. Threatened by forest loss and disturbance, and perhaps by hunting.
- **African elephant (*Loxodonta africana*).** In Uganda, confined to a few large forests and savannah areas. Elsewhere, found in many parts of Africa but range now much reduced (see Figure 3.6). Numbers down from 5-10 million last century, to 2-3 million in 1970, to 600,000 today, 45% of which live in central African forests (WWF, 1991a; Chadwick, 1994). Threatened by expansion of agriculture and forestry, and poaching.
- **Leopard (*Panthera pardus*).** In Uganda, confined to a few large forests and savannah areas. Elsewhere, found in many parts of Africa but range now much reduced. Threatened by forest loss, poaching and reduced abundance of prey species.
- **Cheetah (*Acinonyx jubatus*).** In Uganda, still survives in Kidepo/Karamoja. Elsewhere, found in savannah and semi-desert in many parts of Africa, but many populations now isolated. Threatened by habitat loss, disturbance and reduced abundance of prey species.
- **Nile crocodile (*Crocodylus niloticus*).** In Uganda, confined to larger rivers, lakes and swamps. Elsewhere, found in many parts of Eastern and Southern Africa, but numbers and range much reduced. Threatened by hunting and habitat loss.
- **Grauer's rush warbler (*Bradypterus graueri*).** In Uganda, this bird is confined to swamps in Bwindi and Echuya and possibly elsewhere in Kigezi; elsewhere found in upland swamps in adjacent areas of Zaire, Rwanda and Burundi. Threatened by wetland drainage.
- **Cream-banded swallowtail butterfly (*Papilio leucotaenia*).** In Uganda, occurs in several western forests, mostly lower montane. Elsewhere, confined to the Albertine Rift. Threatened by forest loss and disturbance.
- ***Drypetes gerrardi*, *Premna angolensis* and *Vitex keniensis*.** Three tree species recorded from Uganda and thought to be threatened in some parts of their range through harvesting for timber (see Table 3.3).

**Box 3.2 continued**

**Rare species**

- **Cape clawless otter (*Aonyx capensis*).**
- **Congo clawless otter (*Aonyx congica*).**
- **Forest ground thrush (*Zoothera oberlaenderi*).** In Uganda, this bird is only recorded from Semliki. Elsewhere, probably only found in lowland forests of the Albertine Rift. Threatened by forest loss and disturbance.
- **Nahan's francolin (*Francolinus nahani*).** In Uganda, this bird is found in several western forests and Mabira. Elsewhere, probably only found in lowland forests of the Albertine Rift. Threatened by forest loss and disturbance, and possibly hunting.
- **African green broadbill (*Pseudocalyptomena graueri*).** In Uganda, this bird is only recorded from Bwindi. Elsewhere, it occurs in montane forest in the Albertine Rift. Threatened by forest loss.
- **Chapin's flycatcher (*Muscicapa lendu*).** In Uganda, this bird is only recorded from Bwindi. Elsewhere, it occurs in montane forest in the Albertine Rift. Threatened by forest loss.
- **Turner's eremomela (*Eremomela turneri*).** In Uganda, this bird occurs in Nyondo forest in south-western Uganda. Elsewhere, it occurs in other forests in western Kenya. Threatened by forest loss.
- **Papyrus yellow warbler (*Chloropeta gracilirostris*).** In Uganda, this bird occurs in papyrus swamps around lakes Edward, George, Bunyonyi and Mutanda. Elsewhere, only recorded from one lake in western Kenya. Threatened by habitat loss.
- **African giant swallowtail butterfly (*Papilio antimachus*).** In Uganda, occurs in various western forests. Elsewhere, it is found in forests across central and western Africa. Threatened by forest loss and disturbance, and perhaps by collecting.

**Species of indeterminate status**

- **Rwenzori otter shrew (*Micropotamogale ruwenzori*).** Known only from the Rwenzori of Uganda and Zaire.
- **Long-tailed forest shrew (*Sylvisorex suncooides*).**
- **Kibale ground thrush (*Zoothera kibalensis*).** Only ever recorded from Kibale forest and nowhere else in the entire world, but not seen since 1966. Threatened by forest loss and perhaps disturbance.

**Species of unknown status**

- **Rodent shrew (*Paracrocidura maxima*).**
- **Thomas's bush-baby (*Galago thomasi*).**
- **Jackson's mongoose (*Bdeogale jacksoni*).**
- **Karamoja apalis (*Apalis karamojae*).** In Uganda, this bird occurs in Kidepo and on Mounts Kadam, Kamalinga and Moroto, in shrubby woodland. Elsewhere, only known from central Tanzania. Possibly threatened by forest loss or degradation.
- **Entebbe weaver (*Ploceus victoriae*).** Discovered in 1984, in papyrus swamps near Entebbe. Actual range unknown.

**3.3.6 Threatened species and forestry**

Other organisations have also attempted to produce lists of threatened species for certain regions or countries. Uganda has produced a provisional country list (National Biodiversity Unit, 1992), which includes some of the internationally-threatened species listed above as well as some others that have not been recognised as being internationally threatened, such as giraffe. A similar exercise has been attempted for tropical timber trees, by both FAO (1986) and IUCN (ITTO, 1991). Thirty-one of the species listed occur in Uganda and are shown in Table 3.3. Note, however, that only 12 of them are stated to be specifically threatened in Uganda.

The list may seem a little arbitrary, because of our level of information regarding these trees relative to our knowledge about the distribution of birds and mammals, but it should at least serve as a reminder to foresters that trees, too, may be vulnerable to human activities, and none more so than the mahoganies. Furthermore, it suggests that Uganda has quite a responsibility for ensuring that populations of many other timber tree species remain as healthy as they are, since it is clear that in other African countries they are already dangerously low. It should also be remembered that the list refers only to timber species: there are doubtless many other non-timber species that are equally threatened.

**Table 3.3. Tropical timber species which occur in Uganda and are threatened in part of their range (species threatened in Uganda are emboldened)**

Species	Where threatened	Source
<i>Acacia albida</i>	Israel	FAO (1986)
<i>Aningeria altissima</i>	Côte d'Ivoire, Ghana	IUCN (ITTO, 1991)
<i>Antiaris toxicaria</i>	China, Philippines	IUCN (ITTO, 1991)
<i>Borassus aethiopum</i>	Benin, Côte d'Ivoire, Zimbabwe	IUCN (ITTO, 1991)
<i>Canarium schweinfurthii</i>	Benin, Liberia	IUCN (ITTO, 1991)
<i>Chrysophyllum delevoiyi</i>	Cameroon, Côte d'Ivoire	IUCN (ITTO, 1991)
<i>Chrysophyllum perpulchrum</i>	Cameroon, Côte d'Ivoire	IUCN (ITTO, 1991)
<i>Cordia milleni</i>	Kenya	FAO (1986)
<b><i>Diospyros mespiliformis</i></b>	Kenya, Uganda	IUCN (ITTO, 1991)
<b><i>Drypetes gerrardii</i></b>	Globally vulnerable	IUCN
<i>Entandrophragma angolense</i>	Cameroon, C. d'Ivoire, Kenya, Liberia, Nigeria	IUCN (ITTO, 1991); FAO (1986)
<b><i>Entandrophragma cylindricum</i></b>	Cameroon, Côte d'Ivoire, Uganda	IUCN (ITTO, 1991)
<i>Entandrophragma utile</i>	Cameroon, Côte d'Ivoire, Liberia	IUCN (ITTO, 1991)
<b><i>Funtumia africana</i></b>	Ghana, Uganda	IUCN (ITTO, 1991)
<b><i>Guarea cedrata</i></b>	Côte d'Ivoire, Liberia, Uganda	IUCN (ITTO, 1991)
<i>Irvingia gabonensis</i>	(not stated)	FAO (1986)
<i>Juniperus procera</i>	Outlying populations	FAO (1986)
<b><i>Khaya anthotheca</i></b>	Côte d'Ivoire, Liberia, Uganda	IUCN (ITTO, 1991)
<b><i>Khaya grandifoliola</i></b>	Benin, Uganda	IUCN (ITTO, 1991)
<b><i>Khaya senegalensis</i></b>	Benin, Uganda	IUCN (ITTO, 1991); FAO (1986)
<i>Lovoa swynnertonii</i>	(not stated)	FAO (1986)
<i>Lovoa trichilioides</i>	Cameroon, Côte d'Ivoire, Liberia	IUCN (ITTO, 1991)
<i>Mammea africana</i>	Cameroon, Côte d'Ivoire	IUCN (ITTO, 1991)
<i>Milicia excelsa</i>	Benin, Côte d'Ivoire, Ghana, Kenya, Zimbabwe	IUCN (ITTO, 1991); FAO (1986)
<i>Nauclea diderrichii</i>	Cameroon, Ghana	IUCN (ITTO, 1991)
<b><i>Ocotea usambarensis</i></b>	Kenya, Uganda	IUCN (ITTO, 1991)
<b><i>Olea hochstetteri</i></b>	Côte d'Ivoire, Uganda	IUCN (ITTO, 1991)
<i>Pericopsis elata</i>	(not stated)	IUCN (ITTO, 1991); FAO (1986)
<b><i>Premna angolensis</i></b>	Globally vulnerable	IUCN
<i>Schrebera arborea</i>	(not stated)	IUCN (ITTO, 1993)
<b><i>Vitex keniensis</i></b>	Globally vulnerable	IUCN

### 3.4 LEGAL PROTECTION FOR RARE SPECIES

Designating a species as threatened does not automatically assure it any protection. However, many governments design laws that protect species listed as threatened, either by limiting trade, hunting, collecting or disturbance. Some countries, notably the United States, go one stage further and have legally binding "recovery programs" for threatened species, designed to get

the species off the threatened list through active management.

One international measure that seeks to give some protection to rare or threatened species is the Convention on International Trade in Endangered Species (CITES), of which Uganda is now a signatory along with over 140 other nations. Details of CITES and other agreements are given in Chapter 11.

### 3.5 SUMMARY

This chapter has brought out a number of points that are relevant to a discussion of conservation and forestry in Uganda:

- Many species are naturally rare
- An increasing number of species are becoming rare through human activities, and some are going extinct
- There are various criteria that dictate whether a species will be at risk from human activities
- There are internationally recognised categories of threat to which many threatened species can

be ascribed, but this does not necessarily give any protection to threatened species

- Laws can provide some protection, but often changes in management or attitudes will be more effective
- The three most important threats are habitat destruction, direct exploitation and exotic species
- More threatened species live in tropical forests than in any other ecosystem
- Tropical forest conservation is therefore one of the most important conservation objectives.

### 3.6 FURTHER READING

**FAO.** 1986. *Data book on endangered tree and shrub species and provenances*. FAO, Rome.

**Lee, P.C., Thornback, J. and Bennett, E.L.** 1988. *Threatened primates of Africa: the IUCN Red Data Book*. IUCN, Gland.

**WCMC.** 1992. *Global biodiversity: status of the earth's living resources*. World Conservation Monitoring Centre, Cambridge.