

# Most Endangered Mammals: an Action Programme

*Richard Fitter*

The IUCN's *Red Data Book* for endangered mammals lists 269 species and forms. Of these 135 are on red sheets indicating that they are in real danger of extinction and that only active measures can save them. The FPS Hon. Secretary has selected 25 of these and suggests what action must be taken for each one immediately. The species are arranged here in systematic order, not in any order of priority.

To select the 25 most endangered mammals out of a *Red Data Book* in which 135 forms are given red sheets is no easy task, and inevitably a subjective element must enter in. In making the choice I have taken into account especially the seemingly hopeless cases, where we know (or think we do) just what needs to be done, but for economic, financial, political, social or cultural reasons cannot at present see our way to do it. And this pinpoints the real reason why these animals are becoming extinct: that for the most part man does not care enough whether they do or not. Such a programme will inevitably cost a great deal of money. For years now the wildlife conservation movement has been far too much at the mercy of events. We ought to have been planning to avoid emergencies rather than tackling them as they arise. This crash programme for the most gravely threatened mammals is offered as a first step towards a long-term plan to save endangered species. I have rather arbitrarily drawn the line at 25 species, but in fact several others, notably the orang-utan *Pongo pygmaeus* and the Indian wild ass *Equus hemionus khur* could claim to be equally endangered. The 'action proposed' in each case is also a personal selection, including, of course, many suggestions from the appropriate *Red Data Book* sheet.

For an interesting critique of the action suggestions in the RDB, see Tom Harrison's article in the February *Oryx*.

## 1. Aye-aye *Daubentonia madagascariensis*

So many Malagasy animals, especially lemurs, are endangered, many of them acutely, that it is a particularly arbitrary choice to select one of them for special attention. The aye-aye demands this treatment because it is not only very rare and in serious danger of extinction, but is the sole surviving representative of a whole primate family, the Daubentoniidae. Its numbers are unknown, but possibly not more than about 50, and although it is legally protected, the law is, as usual in developing countries, difficult to administer. It exists in only two reserves, to one of which, the island of Nosy Mangabe, 11 specimens have been translocated. A particular problem relates to local superstitions that attribute bad luck to a sighting of an aye-



GOLDEN LION  
MARMOSET *Zoological  
Society of London*

aye near a village, so that any animals that they see are usually killed.

**Action Proposed:**

1. Strengthen Malagasy official conservation effort, especially in view of recent political developments, perhaps by founding a WWF national appeal.
2. Establishment of securely guarded reserves.
3. Education of villagers as to animal's actual harmlessness.
4. Surveys to look for additional populations.

**2. Golden Lion Marmoset *Leontopithecus rosalia***

Deforestation and the pet trade have brought the golden lion marmoset, also known as the golden lion tamarin, to a low ebb, current estimates varying from 400 to 600. It is now legally protected, but it seems to be impossible to do much to stem the deforestation, especially as the suburbs of Rio de Janeiro are about to be extended into its habitat as a result of the opening of a bridge. Instead individual animals are being collected from threatened areas and taken to a field station for captive breeding in the Tijuca National Park, near Rio de Janeiro, within its former range. Captive breeding will also be undertaken in the United States. If and when the captive breeding succeeds, any surplus will be released in the new Poco das Antas reserve, which at the time of writing (February 1974) is still short of one official act of realisation. Even if these plans are successful, and finance for them is of the utmost importance, the best that can be hoped for the future of the golden lion marmoset is that it will survive in one tiny fragment of its original range.

**Action Proposed:** Continuing finance for the existing translocation and captive breeding schemes is essential if this animal is to survive, but see W. R. Kingston's article on page 471.

### 3. Pig-tailed Langur *Simias concolor*

Confined to three of the Mentawai islands off the west coast of Sumatra, this species is threatened by a combination of unrestricted hunting by local people for food and extensive logging operations. It is not protected, nor is there any reserve for it. Effectively, nothing has ever been done to save it, except to prohibit its importation into the United States. Moreover, it is not known ever to have been kept in any zoo anywhere.

#### Action Proposed:

1. Pressure on Indonesian Government to give legal protection, and set up a reserve.
2. Active investigation of the revised (Tilson) version of the Siberut Project submitted to IUCN, which includes measures to reduce the islanders' dependence on forest wildlife for their protein—see note page 409.

### 4. Mountain Gorilla *Gorilla gorilla beringei*

The eastern mountain race of the gorilla presents the current dilemma of wildlife conservationists in an acute form. We know exactly what needs to be done to save the mountain gorilla, but how are we to do it? Almost confined to the Virunga Volcanoes, where Rwanda, Uganda and Zaïre meet, most of its territory lies within national parks or reserves. Well under 1000 remain anywhere, and the Virunga population has fallen from 400/500 in 1959 to 375/400 today. A substantial slice has been excised from the Rwanda national park—10,000 ha. out of a total of 33,000 ha.—and devoted to pyrethrum growing, under a scheme promoted by EEC countries. Disturbance of the gorillas by human activities, notably cattle grazing and poaching, continues on a scale that is unacceptable if the gorillas are to survive.

**Action Proposed:** If the promised appointment of a new Rwandese Conservator does not take place, high-level intervention with the Rwanda Government will be needed to strengthen the administration of the national park and ensure the effective protection of the gorillas. Only under the supervision of a conscientious Conservator can the Park guards be properly trained, their numbers increased and their patrols supervised. The Rwandese Park guards should have the same authority as the Zaïrois Park guards have to kill cattle found grazing in the Park and to fire three warning shots on making contact with poachers. A unification of the conservation efforts, guard patrols in particular, of the three countries sharing the Virunga Volcanoes' protected area (Rwanda, Uganda, Zaïre) would be an invaluable means of checking the poachers and other trespassers who now regularly and quite illegally cross both national and park boundaries. In the long term some means of making international money available to Rwanda on a semi-permanent basis will be necessary, if so small and overpopulated a country is to continue to hold the Parc des Volcans inviolate.

### 5. Red Wolf *Canis rufus*

Despite the active conservation steps taken by the US Fish and Wildlife Service, the red wolf is undoubtedly one of the half-dozen most seriously endangered species listed here. It is confined to part of the coastal marshlands of Texas and Louisiana, and even there only one or two pure populations are known. All others are partly hybridised with coyotes and dogs. Total numbers are unknown. Add to this the fact that every man's hand is normally turned against wolves, and that habitat destruction continues steadily, favouring the coyote, and the red wolf's plight is seen to be unique.

#### Action Proposed:

1. Continuation of present measures.
2. Safeguarding in three national wildlife refuges.
3. Creation of buffer zone against coyotes, including coyote-proof fence.
4. Removal of nuisance animals for captive propagation.
5. Building up of captive stocks.
6. Educational programmes to eliminate killing by private individuals.
7. Further search for surviving pure populations.

All these methods are being tried but clearly they are still inadequate. A direct approach to the US Department of the Interior and the States of Texas and Louisiana may be needed to get the effort stepped up.

### 6. Mexican Grizzly Bear *Ursus horribilis nelsoni*

This is a species whose actual survival is in doubt. The last positively known population was destroyed by a rancher in the Sierra del Nido in northern Mexico about ten years ago. Another small population has been reported from the upper Yaqui basin of Sonora, but still awaits verification by a competent authority. The Mexican Government protects bears, but is unable to enforce its law. Direct killing by man is undoubtedly the main danger.

**Action Proposed:** Urgent verification of report, followed by adequate protective measures at the site if it proves positive.

### 7. Black-footed Ferret *Mustela nigripes*

It used to be thought that the reason the black-footed ferret has reached the verge of extinction, so that it is only known with certainty from South Dakota, was because its sole habitat is the prairie-dog towns of the Great Plains; farmers consider the prairie dog a pest and constant war has been waged against it with poison that kills the ferrets too. Deeper investigation suggests that, although prairie-dog control appears to be the major cause, canine distemper, shooting by sport hunters, and highway-traffic kills are also important factors.

**Action Proposed:** The most effective single policy for the rehabilitation of the black-footed ferret, would appear to be the total cessation of all poisoning of prairie-dog towns. Failing this, the US Endangered Species Bureau is probably doing all that can



GIANT OTTER *Nicole Duplaix-Hall*

reasonably be expected of it at present. However, the RDB says nothing of any action in Alberta, the only recently reported locality for these ferrets without the US. Some inquiry should be made of the Alberta Game Department or other appropriate authority.

#### **8. Giant Otter *Pteroneura brasiliensis***

The giant otter of the Amazon basin typifies the plight of many other Amazonian animals. It is the victim of the still almost unchecked pillaging of the wildlife of the Amazon forests, mainly for the North American market. These forests are so vast that actual numbers of the otters may well be greater than all but a few of the endangered species listed here. But except in a few national parks and reserves it has gone from all accessible rivers, and will obviously be exterminated everywhere else, as and when development makes other rivers accessible to hunters. Legal protection already prevails in Brazil, Colombia, Ecuador and Peru, but, as throughout Latin America, legal protection means little or nothing without effective enforcement, which is almost everywhere lacking.

**Action Proposed:** Nothing short of the total prohibition of the Amazonian animal trade, and especially that part of it which still operates between Letitia and Miami (now perhaps also through Barranquilla and Curaçao) will ultimately save the giant otter. As a first measure, the new legal protection in Colombia will help, and the Endangered Species Convention when in force should also help, but so long as any legal animal trade persists, poachers are bound to find ways and means of disposing of so valuable a pelt as that of the



**BLACK-FOOTED FERRET** *Luther C. Goldman Bureau of Sport Fisheries Wildlife*  
giant otter. Until the Letitia situation can be dealt with effectively, however, the trade is likely to continue. In Latin America no national parks can ever be considered really safe, and some areas should be bought by WWF or Nature Conservancy funds and set permanently aside for this and other threatened Amazonian species.

#### **9. Florida Cougar** *Felis concolor coryi*

The RDB is seriously out of date in its estimate of this race's numbers, using a figure of 130–300 dating back to 1961. A later estimate was only about 100, and the latest survey gives 20–30 south of Lake Okeechobee and 'far fewer than this number' in the rest of Florida and neighbouring states. It exists in the Everglades National Park and several national wildlife refuges. The great bulk of its former habitat is now farmed. The cougar is fully protected in Florida, and its main enemy is clearly the irresponsible man with a gun, many hunters and ranchers declaring flatly that they will continue to kill it notwithstanding.

**Action Proposed:** It is difficult to see what can be done other than to create a climate of public opinion in which it would be unthinkable to kill such a rare creature. More sanctuaries of various kinds would also help, as would an increase of wild deer in the state, to provide a better wild-food supply. It may be that to try to maintain so large a predator in so thickly populated an area as Florida is as impossible as would be the continued existence of the wolf in England—or Florida. If this is so, perhaps conservationists should cease attempting the impossible, and fall back on captive breeding.

#### **10. Asiatic lion** *Panthera leo persica*

This is one of the test cases for the survival of endangered species. Since the lion became restricted to the Gir Forest in Gujarat, north-western India, the full gamut of survival techniques has been applied to it: special sanctuary, full protection, ecological survey, scientific presence, compensation to owners of cattle it kills for food,

treatment as a top tourist attraction. Yet still it continues to decline, basically because its habitat continues to deteriorate owing to overgrazing. Numbers are now down to 177.

**Action Proposed:** The Gujarat Government's present policy of setting aside an inviolate inner sanctuary where cattle grazing will be greatly reduced and controlled so that the natural ungulate prey can build their numbers up again, seems to be the only possible one. If this cannot be enforced, the lions will eventually be eaten out of house and home by the half-million cattle that currently graze their sanctuary. It would greatly help if the plan to have an ecological research institute located in the Gir Forest, to provide a continuing scientific presence, could be revived.

### 11. Tiger *Panthera tigris*

The tiger is threatened throughout its extensive range from the Caspian to the Pacific, except perhaps in the Soviet Far East. Here it is claimed that, although numbers are low, protection is sufficiently well enforced to permit a small number to be captured each year. The latest news from China is that the official policy of exterminating tigers as 'an impediment to agricultural and pastoral progress' has been reversed in favour of giving 'some protection'. The basic threat to the tiger everywhere is the spread of human development and settlement, which both deprives it of habitat and natural prey, and creates tension when the tiger inevitably preys on the introduced domestic stock instead. In view of the fate of the larger carnivores wherever human settlement has become established, it is extremely doubtful if the tiger can survive into the 21st century anywhere outside national parks and reserves, and a few very remote mountain areas. (Will anywhere still be remote by 2001?) Six of the eight races of the tiger are allotted red sheets, and the Bali race may already be extinct. The Javan race is excessively rare, being recently reported from only two localities.

#### **Action Proposed:**

1. The full implementation of Operation Tiger, perhaps the most ambitious international conservation effort ever launched to save a single species, is essential if the tiger is to have a chance to survive. This means that the tiger must be preserved in an adequate number of well protected reserves throughout its range. Only in India, Nepal, Bangladesh and Siberia is this being properly planned at present, although we still do not know enough about the position in China.
2. Effective control of the international fur trade, especially through the Washington Convention, is also vital.
3. In India steps must be taken to eliminate the trade in 'existing stocks' in the states, and to secure much greater control of the use of chemicals, such as folidol and endrin, for poisoning wildlife.

### 12. Japanese Sealion *Zalophus californianus japonicus*

This is the most probably extinct of the 25 main species or forms discussed here. If it survives, it is considered most likely to be in



Korea. Persecution by fishermen, occupation of islands by the military, and the general aftermath of World War II are the main factors bringing this sealion to or near extinction. It appears to be nowhere protected.

**Action Proposed:**

1. Survey of the Korean coast, especially of the east coast and of Take-Shima island in South Korea, to ascertain if any stocks survive.
2. Precautionary protective legislation should be passed by all governments in the region.

**13. Mediterranean Monk Seal *Monachus monachus***

The constant warfare between fishermen and all species of seals is the main reason why some seals become endangered. Disturbance of their breeding caves by holidaymakers and others also ranks as an important cause of the monk seal's decrease. This seal is still not protected by law in several of the countries where the 500–1000 survivors still breed. No breeding colony is in a reserve.

**Action Proposed:**

1. Pressure on the Governments of Bulgaria, Libya, Morocco, Mauretania, Portugal and Turkey to accord legal protection.
2. Pressure on these governments and those of Italy and Spanish Sahara to create sanctuaries for all the breeding colonies in their areas.

**14. South American Manatee *Trichechus inunguis***

The South American or Amazonian manatee appears to be one of the most acutely endangered mammals in the world. Ruthless hunting for its meat seems to have brought it nearer to extinction than any other Amazonian mammal, although there are no quantitative population estimates whatever. In a region of such



extreme poverty it is probably hopeless to expect effective protection outside well guarded reserves, although the manatee is legally protected in both Brazil and Peru. Its status on the Orinoco is obscure.

**Action Proposed:**

1. Immediate establishment of the proposed reserve on the Rios Pacaya and Samiria in Peru (see remarks under giant otter).
2. Urgent investigation of a suitable reserve or reserves in Brazil.
3. Survey of the Rio Orinoco to establish its status there.
4. Renewed attempts to make the legal protection in Brazil and Peru effective.

**15. Przewalski's Horse *Equus przewalskii***

Almost extinct in the wild, although its future in captivity seems to be secure, with 196 in 52 zoos and other collections. The only surviving wild animals—no precise figures but probably well under 50—are on the Mongolian-Chinese border, and may cross it seasonally—Mongolian zoologists receive reports of sightings from time to time. The horse is fully protected in Mongolia, but cattle-pasturing even in these remote regions is thought to threaten its water sources. Nothing is known of the position in China.

**Action Proposed:**

1. Assistance to the Mongolian authorities to create a reserve.
2. Contact with the Chinese authorities to ascertain the position on their side of the frontier.

Ivor Montagu points out that the closely related Indian wild ass *Equus hemionus khur* had declined at its last census (1969) to 362 from several thousand only a few years earlier, and, in view of developments near its sole area (the Little Rann of Kutch), an up-to-date report on its status is urgently needed.

**16. Great Indian Rhinoceros *Rhinoceros unicornis***

Estimated numbers in the wild in India and Nepal have fallen from 700 in 1959 to 630 in 1971. There may also still be a handful just over the border into Burma. All known populations are already in reserves, and the problem is one of stopping poaching for the insatiable Chinese market for rhino horn as an aphrodisiac. In 1971/72, for instance, poachers killed almost half the surviving 60 rhino in Jaldapara reserve in West Bengal, and numbers in Nepal fell from 300 in 1959 to 70 in 1971. If this rate of erosion were to prevail in other reserves, there would be no wild ones left by 1980. The situation in Kaziranga (Assam) leaves much to be desired, but fortunately anti-poaching patrols are much more effective in Chitawan (Nepal). In the latter no rhinos were lost in 1973, compared with an annual loss of 10-12 previously. A further protection lies in the fact that a good zoo, such as Basel, is able to breed this species in captivity.

**Action Proposed:**

1. Strengthening of guards, especially at Jaldapara and Kaziranga.
2. More captive breeding; no zoo should be allowed to keep an unpaired animal.

**17. Sumatran Rhinoceros *Didermoceros sumatrensis***

Extraordinarily little is known about the actual distribution today of this retiring jungle species, though it is believed to be still widely but very thinly scattered over south-east Asia, from Burma and Indochina to Sumatra and Borneo. Population estimates are available only for Burma (24), Thailand (10–20, some of which may move across the Burmese and Malayan frontiers and be counted in their totals), Malaya (8–15) and Sumatra (45–85). It occurs or is believed to occur in eight or nine reserves in Thailand, Malaya, Sumatra and Sabah, but, like many other jungle species of this region, its future is tied to that of the rapidly diminishing rain forest. The Malaysian reserves in particular are under great pressure. Another important factor is poaching for rhino horn which is exported and sold for very high prices especially to China and other eastern countries.

**Action Proposed:**

1. Urgent steps to safeguard an irreducible minimum of the rain forests of south-east Asia, perhaps by setting up more national parks.
2. An expedition to the Burma–India frontier to determine the species to be found on the Burmese side of that frontier, which could be any one of the three Asian rhinos.
3. A captive-breeding project as a fall-back measure.

**18. Northern White Rhinoceros *Ceratotherium simum cottoni***

Political and military upheavals have affected the northern race of the white rhino to a greater extent than any other large mammal in the *RDB*. It suffered a catastrophic blow when the thriving population in the Garamba National Park in Zaïre was slaughtered by rebel troops in 1963–65, followed by Sudanese poachers, and reduced by 1971 to 20–30. Since there are only about 110 in Uganda (1971 figure, including 18 introduced into the Kabalega (Murchison Falls) National Park) and no more than 10 in the Central African Republic, while numbers surviving in Sudan are still unknown, this is an extremely endangered race. The present (1974) situation in Uganda is unknown. Poaching is probably the major threat everywhere.

**Action Proposed:**

1. Immediate investigation of current situation in Uganda and the Sudan.
  2. Translocation of more animals from Ajai reserve in Uganda to Kabalega National Park.
- On no account should southern white rhinos be introduced into national parks within the range of the northern.

### 19. Formosan Sika *Cervus nippon taiouanus*

The Formosan race of the sika deer is representative both of many other species and races of deer, and of many other larger animals and birds of Taiwan, in being threatened by the twin dangers of habitat destruction and overhunting, especially the latter. It is fully protected by law, but the law is not enforced. Probably fewer than 300 survive in the wild, but a captive herd of 100–200 is farmed for meat.

#### Action Proposed:

1. Financing of a survey, which the Taiwan Forestry Department is willing to undertake, to determine the precise surviving range.
2. Creation of a properly warded reserve or reserves.
3. Enforcement of the existing law.
4. Reintroduction into the wild, which should be possible from the breeding potential of the 374 animals in 30 zoos.

### 20. Manipur Brow-antlered Deer *Cervus eldi eldi*

This deer presents a particularly intractable problem, in that it is confined to a single threatened habitat in a part of India to which visits from the outside are forbidden for security reasons. In the past ten years the stock, already greatly diminished through poaching by the military and others, has been halved and now stands at only 50. Moreover, a hydro-electric works will alter the habitat by raising the water level. There are 32 specimens in captivity in three zoos.

#### Action Proposed:

1. The Keibul Lanjao Sanctuary should be declared a national park, all forms of disturbance excluded and the staff increased (from 8 to 24 is suggested).
2. A captive breeding herd, to be stocked from Delhi Zoo, should be set up in the sanctuary area, from which a second free-ranging herd should be reintroduced into some other part of the former range.
3. An ecological survey of the habitat, and a survey of the likely effect of raising the water level of the lake should be made.

### 21. Tamaraw *Bubalus mindorensis*

The tamaraw is another instance of an ungulate severely endangered by the twin threats of habitat destruction and overhunting. At one time numbers appear to have been down to well under 100. At this point, although the remarkably inadequate RDB sheet says nothing about it, the Survival Service Commission stepped in with one of its most effective interventions, and sent a two-man team of General Charles Lindbergh and Professor Tom Harrisson to the Philippines. As a result sanctuaries were established on Mindanao in the three principal areas where tamaraw stocks of any size survived, and the protection law is now strictly enforced. Numbers have risen to 148, but are not yet large enough to safeguard the tamaraw's future, especially as a technique for captive breeding has not yet been discovered.

**Action Proposed:**

1. Continuation of present strong measures in the Philippines.
2. An enhanced research programme to ensure that all suitable remaining habitat can be made available as the wild stocks increase.

**22. Kouprey *Bos sauveli***

Only discovered as recently as 1937, when there may already have been no more than 1000 in existence, the kouprey's total population, thanks to the usual Asian syndrome of overhunting and habitat destruction, had fallen by 1970 to an estimated 30–70. It may already be extinct, since its three sanctuaries in Cambodia have all been overrun by anti-government forces, and gun-happy soldiers are notoriously the worst enemies of endangered ungulates. The latest information (May 1974) is that a very few survive. Only a single animal ever seems to have been held in captivity.

**Action Proposed:** The situation of the kouprey is so desperate, and its natural habitat has become so dangerous an environment, that the only way of saving it is thought to be a capture expedition with a view to establishing a breeding stock in captivity. Some funds are available and an expert is standing by to go at once to find out if any survive as soon as the fighting in Cambodia stops.

**23. Arabian Oryx *Oryx leucoryx***

This is a prime example of an animal threatened solely by human cupidity. Almost alone among the 25 species considered here, its habitat remains unchanged and substantially unthreatened. There is some reason to fear that the Arabian oryx may already have been exterminated in the wild by the continual large-scale poaching ex-



A CAPTURED TAMARAW — with Dr Tom Harrison in attendance during his SSC mission to the Philippines with General Lindbergh Timothy Green

peditions to its south-east Arabian habitat from the western shore of the Gulf, but it may be some years before we can be sure of this (see Henderson in *Oryx*, February 1974). Fortunately, three established large captive herds, the World Herd at Phoenix, Arizona, Sheikh Quassim's herd in Qatar, and the herd at Los Angeles Zoo, California, have shown that the species breeds well in captivity.

**Action Proposed:**

1. Continued building up of captive breeding herds.
2. As soon as practicable, some of these should be released into the wild, as near to the Arabian peninsula as it is possible to provide a genuinely safe desert reserve. The future of no threatened animal is more dependent on politics than this one.

**24. Dibatag *Ammodorcas clarkii***

This large gazelle was on some early lists of endangered species, though not on the earliest of all in 1949, but was later dropped since it appeared to be comparatively common in Somalia. Recent information, however, suggests that it is now extremely rare throughout its limited range in the Horn of Africa (Kenya, Somalia, Ethiopia), and should be considered as a candidate for a red sheet in the RDB. The main trouble has been overhunting in Somalia, aggravated no doubt by overgrazing.

**Action Proposed:**

1. An urgent survey to ascertain the current status of the dibatag in the three countries.
2. Launching of a captive-breeding programme, which could most appropriately be centred on the US National Zoo's new facility at Front Royal, Va.

**25. Walia Ibex *Capra ibex walie***

This is another case where we know exactly what needs to be done, but are finding it exceedingly difficult to do it. The total population is between 200 and 300, most of it within the Simien National Park in Ethiopia, where the poaching is now being brought under control. The precipitous cliffs of their habitat are almost indestructible, but ibex also need undisturbed forest and alpine meadows, which are not; the forest is being steadily cut into—see page 405, and also *Oryx*, May 1973, page 10.

**Action Proposed:**

1. Maintaining effective wardening of the national park.
2. Enough tourism to provide manifest benefits for the local inhabitants.
3. Technical assistance to the local farmers, who are the chief poachers, to encourage them to abandon shifting agriculture and settle outside the park, using more modern methods.
4. A captive-breeding programme is essential.

WALIA  
IBEX  
F. Vollmar



### Summary of Recommendations

Analysis of the recommendations for 'Action Proposed' shows that the single most important need is for the creation of reserves to safeguard the species (nine cases). In two cases, continuation of existing reserves is mentioned, and in one (Manipur brow-antlered deer) the upgrading of a reserve to a national park. For five species the strengthening of the park-guarding arrangements, primarily to prevent poaching, is regarded as the highest priority, and for two of these species (mountain gorilla, Indian lion) the removal of grazing cattle is also stressed. For another six species the strengthening of the official effort in general is the prime need.

Despite Tom Harrisson's strictures in the February *Oryx* against rushing into surveys, a further nine species prove to require a status survey in all or part of their range, as one of the most urgent steps to be taken if they are to be effectively safeguarded. Surprisingly, only two species (Manipur brow-antlered deer, tamaraw) call for an ecological survey or ecological research, and only with the Indian lion is the continuing scientific presence of a research institute mentioned as a high priority.

A third urgent measure is captive breeding (ten cases), coupled often with translocation to a safe habitat (five)—particularly appropriate for ungulates.

Other measures include more education or propaganda (three); according of legal protection (three: it is surprising that even three gravely endangered species, two of them seals, still lack legal protection); the ending of poison campaigns (black-footed ferret, tiger); the stopping of trade (giant otter, tiger); increase of prey species in the habitat (Florida cougar, Indian lion); help to local farmers (pig-tailed langur, walia ibex); and the promotion of tourism (walia ibex).

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