

Burma

Species Conservation Priorities in Burma

John Blower

Introduction

Burma (Fig. 1), with a total area of 676,756 km², extends from latitude 10° N in the extreme south, to latitude 28° N on the northern border with Tibet, a total distance of some 2093 km. Between these two extremes there exists an ecological spectrum of almost unique variety, ranging from tropical rainforest and coral reefs in the south to temperate forests of conifers, oaks and rhododendrons in the far north, where snow-capped mountains up to 5792 m mark the eastern extremity of the Himalayas.

High mountain ranges form a continuous barrier along the western border with India and Bangladesh, extending southward parallel with the coast nearly to the Irrawaddy Delta. In the northeast the border with China follows the high crest of the Irrawaddy-Salween divide, then bulges out eastward to enclose the Shan Plateau, a vast area of rugged mountain country bordering with Laos and Thailand. Between these mountain barriers to the west and east lies the fertile, heavily populated basin of the Irrawaddy, with its largest tributary, the Chindwin, joining it from the northwest. Burma's other great river, the Salween, flows south through neighboring Yunnan and then cuts through the Shan Plateau in deep, heavily forested gorges before finally reaching the sea in the Gulf of Martaban. Further south, Tenasserim extends in a long mountainous arm bordering with Thailand down to the Kra Isthmus.

Apart from the northern uplands of Kachin State, the climate of Burma is tropical monsoonal, with a rainy season coinciding with the southwest monsoon from May to October and a generally well marked dry season from November to April. There are, however, important local variations, with mean annual rainfall ranging from as little as 762 mm in parts of the central Dry Zone to over 6350 mm in Tenasserim.

The population is about 33 million with an average density ranging from less than 10 per km² in some of the peripheral mountain areas to nearly 350 in the very heavily populated Rangoon Division, and over 116 in the Irrawaddy Delta, giving an overall density of about 46 per km², which is well below the average for southeast Asia. The annual population growth rate has been fairly constant in recent years at about 2.2%. Agriculture, including timber production, employs two-thirds of the work force and 76% of the population still lives in rural areas.

The officially quoted figure of 57% overall forest cover in Burma is somewhat out of date. The report of the FAO/UNEP Tropical Forest Resources Assessment Project (FAO/UNEP, 1981), based on analysis of Landsat satellite imagery, estimated about 47% forest cover in 1980, including all types of woody growth such as scrub woodland and bamboo in addition to high forest. The annual rate of deforestation through shifting cultivation and other causes was estimated at around 101,175 hectares per year.

Forests may be broadly divided into four main categories:

1. *Tropical moist forest*, which includes the evergreen dipterocarp rainforest of the high rainfall areas in Tenasserim, Kachin State, and Upper Chindwin; the semi-evergreen forests of Arakan and parts of North Burma, and the extensive moist deciduous forests, which are of great importance for production of teak and other commercial hardwoods. It also includes the various types of tidal and fresh water swamp forests.
2. *Tropical dry forest*; mixed deciduous forests including *indaing* — characterized by the presence of *Dipterocarpus tuberculatus*, dry teak forest and other types of rather open, stunted woodland found in the drier areas.
3. *Montane sub-tropical forests*; typically including *Quercus*, *Castanopsis* and pines (*Pinus merkusii* and *P. insularis*) in mountain areas from 915-1524 m, and sometimes higher.
4. *Montane temperate forests*; occurring between 1524 and 3659 m, and characterized by *Quercus*, *Castanopsis*, *Schima*, pines (*P. excelsa* and *P. wallichiana*), and at highest elevations in north Burma, *Tsuga*, *Abies*, *Betula* and rhododendrons.

Species Conservation in Burma

Most of Burma lies within the Indochinese Zoogeographic sub-region of the Oriental region, with the Arakan and Chin Hills in the Indian sub-region, and the high mountains of the extreme north, with their typically Himalayan species, in the Palearctic region.

Large mammals such as elephant (*Elaphas maximus*), gaur (*Bos gaurus*), banteng (*Bos javanicus*), sambar (*Cervus unicolor*), barking deer (*Muntiacus muntjak*), tiger (*Panthera tigris*) and leopard (*P. pardus*) are widely distributed in the less disturbed forested regions of most of Burma apart from the far north. But in the absence of factual data their status is uncertain. Two species of rhinoceros formerly occurred in Burma, of which the Javan rhinoceros (*Rhinoceros sondaicus*) is already extinct and the Sumatran (*Dicerorhinus sumatrensis*) probably so.

Among other larger mammals, the distributions of which are more localized, are hog deer (*Cervus porcinus*), musk deer (*Moschus moschiferus*), thamin (*Cervus eldi*) — in the drier areas of central Burma, tufted deer (*Elaphodus cephalophus*) from the northeast border with Yunnan, and two species of mouse deer (*Tragulus napu* and *T. javanicus*) in Tenasserim. There are also three species of goat-antelope; takin (*Budorcas taxicolor*) — which occurs only in the north of Kachin State, serow (*Capricornis sumatraensis*) and goral (*Nemorhaedus goral*). Tapir (*Tapirus indicus* Fig. 2) were formerly found in mainland Tenasserim ap-

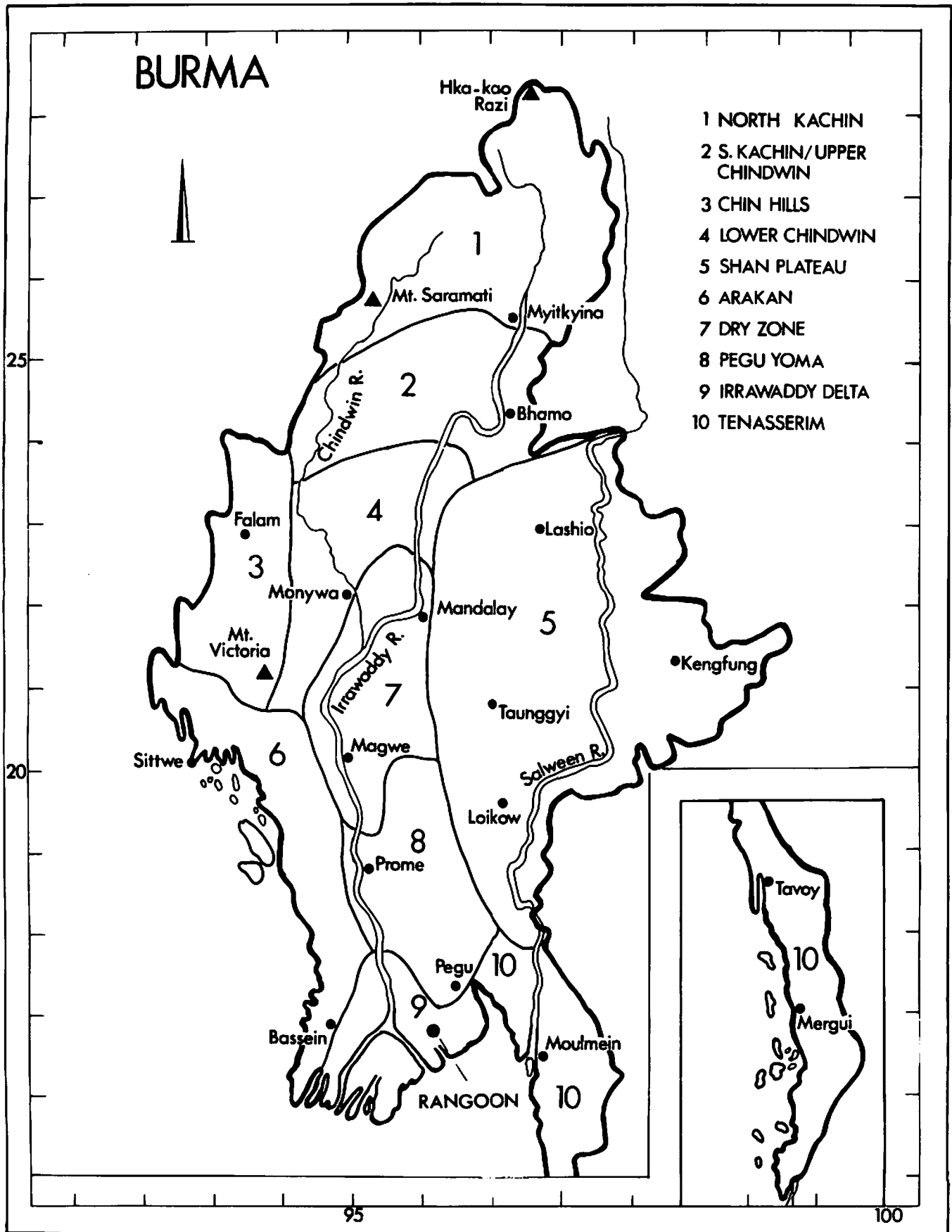


Fig. 1: Map of Burma showing major geographical subdivisions, towns and rivers.

proximately as far north as latitude 18° N, but whether their present range extends so far north is uncertain.

Carnivores include two species of bear (*Helarctos malayanus*; Fig. 3) and *Selenarctos thibetanus*), clouded leopard (*Neofelis nebulosa*), wild dog (*Cuon alpinus*), Asiatic jackal (*Canis aureus*) and, in northern Kachin State, red panda (*Ailurus fulgens*), and possibly wolf (*Canis lupus*).

Among primates, several species of *Macaca* and *Presbytis* are fairly widely distributed, and there are also two gibbons, the hoolock (*Hyllobates hoolock*) of Upper Burma and the white-handed gibbon (*H. lar*) of Tenasserim.

Marine mammals and reptiles occurring in coastal waters and riverine estuaries include the now very rare dugong (*Dugong dugon* Fig. 4), the salt water crocodile (*Crocodilus porosus*) and possibly five species of marine turtle, of which the commonest are the green turtle (*Chelonia mydas*) and probably the olive ridley (*Lepidochelys olivacea*) (although the latter has in the past been confused with the loggerhead (*Caretta caretta*) and the relative status of the two species is unclear).

About one thousand bird species have been recorded from Burma (Smythies, 1953), this relatively high species diversity being due to the fact that the country extends into two zoogeographic regions, each with different bird faunas. The forests of Tenasserim contain many Malesian species, whereas in the central and northern part of the country the bird fauna has Indian and Chinese affinities. A large number of Himalayan species occur in the montane forests of north and west Burma. There are relatively few endemic species (Sayer, 1983).

There is, as yet, little information on the status, distribution and ecology of individual species, though there is no evidence that any major species is seriously endangered, apart from vultures, which have practically disappeared from most of Burma in recent years.

The main threats to bird life are the conversion of wetlands to agriculture, the habitat of waterfowl and waders including the large numbers of migratory species which winter in Burma, hunting and trapping, especially of pheasants and peafowl, and the use of agricultural pesticides such as Endrin, which is a serious threat to scavengers and seed-eaters. The principal conservation needs for birds are the protection of sufficient areas of natural habitat, especially wetlands, and research to obtain data on the status and distribution of individual species, particularly those which are either rare or endemic to Burma.

Wildlife conservation has hitherto been the responsibility of the Forest Department. Apart from the Reserved Forests which total 90,673 km², or approximately 13.5% of the total land area, there are 14 wildlife sanctuaries. However, most are relatively small, their aggregate area being only 4,728 km², or approximately 0.7% of the total land area.

Apart from the inadequate size of existing protected areas, both individually and in aggregate, they also fail to provide representative coverage of several important biota, including the northern temperate forests, the evergreen dipterocarp forests of Tenasserim, and coastal areas including the Irrawaddy Delta and the Mergui Archipelago with its coral reefs.

Under existing legislation, which dates from the pre-World War II colonial era, the fauna in wildlife sanctuaries is protected but the habitat is not, with the result that many areas and species have suffered serious damage. Moreover, in most cases effective protection of wildlife has not been possible due to shortage of Forest Department staff.

Wildlife in Reserved Forests enjoys a certain degree of legal protection and may not be hunted without a special permit. But here again, effective law enforcement is difficult due to staff short-



Fig. 2: The Malayan tapir (*Tapirus indicus*) an endangered species from Burma (photo by R. A. Mittermeier).



Fig. 3: The sun bear (*Helarctos malayanus*), one of two bear species found in Burma (photo by R. A. Mittermeier).

ages and the large numbers of firearms in the hands of the military and para-military People's Militia.

In 1981, the Government, with assistance from FAO/UNEP, introduced a new Nature Conservation and National Parks project with the object of ensuring more effective protection of flora, fauna and natural landscapes, including establishment of national parks and other protected areas. Preliminary surveys of over twenty potential sites have been completed (June, 1983), and several have been identified as suitable for establishing national parks, nature reserves or sanctuaries. Other areas, particularly in northern Burma, still remain to be surveyed.

Species Conservation Action Priorities

The most urgent priorities are the conservation of large mammals, particularly elephants, marine turtles and the saltwater crocodile. In the almost total absence of reliable data on the present status of wildlife populations in Burma it is impossible to give anything other than a very subjective impression of the degree to which individual species may or may not be endangered.

Elephant (Elaphas maximus). The elephant is of major economic importance to Burma for extraction of teak and other hardwoods, which are one of the country's main sources of foreign exchange. There are approximately 5,400 captive elephants in Burma, most of which are employed in the timber industry. However, the annual reproductive rate among timber elephants is on-

ly about 5.3 per 100 breeding females, which, allowing for mortality, is insufficient to maintain this population without influx from the wild. Consequently, it is necessary to continue the capture of wild elephants at an average rate of about 120 per year.

Estimates of the wild elephant population in Burma range from 3,000 to 6,000, but observations in the limited areas covered so far by our surveys indicate that the lower figure is probably the more realistic. Mortality in capture operations is officially admitted to be about 20%, and may even be higher. There is also a significant amount of illegal capture and smuggling of elephants to Thailand, and also poaching for ivory (38 animals are known to have been successfully smuggled to Thailand in recent months and a further 11 were intercepted en route and confiscated). Therefore, while it is not yet possible to give any reasonably accurate estimate of actual numbers, it is certain that the overall annual offtake from legal and illegal capture and poaching is appreciable.

In nearly all the areas so far surveyed the elephant population has been found to be appreciably lower than previous official estimates. It is therefore reasonable to assume that the overall population is also considerably lower than the official figure of about 6,000, and that with continuing offtake, known and unknown, numbers are steadily declining.

ACTION REQUIRED:

1. Field research to obtain data on the present status and distribution of wild elephants and to monitor future trends;
2. Based on results of the above, to establish elephant ranges or nature reserves of sufficient size wherein viable populations can be effectively protected;
3. Study of the management of captive elephants, with a view to increasing the birth rate to a level where the population can be self-sustaining;
4. Progressive reduction in numbers of capture permits issued, combined with law enforcement to control poaching, illegal capture and smuggling.

Rhinoceros (Dicerorhinus sumatrensis). This species formerly occurred in Kachin State, Upper Chindwin, Arakan, Mongmit/Mandalay Division, Kayah State and Tenasserim, but there have been no recent confirmed reports of its survival in any of these areas and it may already be extinct.

The only areas where it has been reported to occur during the past 20 years are the Tamanthi Wildlife Sanctuary in Upper Chindwin and Shwe-u-daung Sanctuary on the border between Mongmit and Mandalay Divisions. However, both these areas have been subject to extensive insurgent activity, and it is doubtful that any rhino still survive. Surveys of both areas are planned for the 1983/84 dry season.

ACTION REQUIRED:

1. Surveys of Tamanthi and Shwe-u-daung Wildlife Sanctuaries and any other appropriate areas to determine whether or not any rhinoceros survive;
2. Subject to confirmation of their survival in any area, to plan and implement effective conservation measures without delay (including possible upgrading of the area concerned to National Park or Nature Reserve status).

Thamin (Cervus eldi thamin). The Burmese subspecies of this deer is confined to the drier areas of central Burma, and there have also been unconfirmed reports of its occurrence in Paan Division to the east of the Salween, near the Thai border. Although fully protected by law, thamin are widely hunted, but fortunately appear able to withstand hunting pressure moderately well and

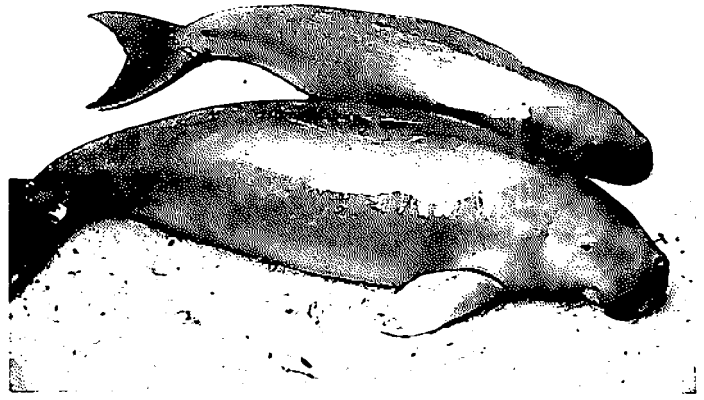


Fig. 4: The dugong (*Dugong dugon*), now very rare in Burman coastal waters (photo by R. A. Mittermeier).

also to adapt to habitat changes. However, their range has been considerably reduced, and although they are spottily distributed throughout much of Shwebo Division and elsewhere in central Burma, the only population which can be regarded as truly viable is in the Kyatthin Wildlife Sanctuary in Shwebo Division. There are believed to be about 2,000 thamin there and a few hundred in the somewhat larger, but much degraded Shwezettaw Wildlife Sanctuary to the west of the Irrawaddy in Minbu Division.

Thamin are vulnerable, but not yet endangered, though conservation measures are needed if they are to survive in the long-term.

ACTION REQUIRED:

1. Enlargement of the Kyatthin Wildlife Sanctuary with realignment of boundaries to exclude villages presently contained within;
2. Upgrade the status of Kyatthin to Nature Reserve with provision of sufficient staff to protect it;
3. Full protection of thamin elsewhere, with severe penalties for illegal hunting; and
4. A research program on thamin ecology.

Wild Cattle (Bos spp.). Gaur (*Bos gaurus*) and banteng (*Bos javanicus*) occur throughout much of Burma in areas where there is still good forest cover and little human disturbance, gaur generally preferring more hilly country than the banteng. Although theoretically protected, both species are heavily hunted and are becoming increasingly scarce. Both are vulnerable, if not endangered.

ACTION PRIORITIES:

1. Establish one or more national parks or nature reserves of adequate size wherein there are viable populations of these species and provide sufficient staff to protect them (the proposed Alaungdaw Kathapa and Pegu Yoma National Parks would be very suitable for this purpose);
2. Enforce the law to stop the killing of these animals for meat, especially by the Army and the People's Militia;
3. Survey to ascertain status and distribution as a basis for further conservation planning.

Tiger (Panthera tigris). Burma is the only country where the tiger occurs that it is not protected by law. When the present law was introduced (1936), tiger were still plentiful in Burma, causing considerable damage to domestic livestock and constituting a serious menace to human life in certain areas. Consequently,

they were at that time regarded as "vermin" and were not placed on the protected list.

The situation today is very different. There are a few isolated areas such as the proposed Alaungdaw Kathapa National Park where tiger are still relatively plentiful. But in most areas they are now rare, as has been clearly shown by recent field surveys, which revealed very few signs of tigers. This is probably due both to scarcity of prey species such as the heavily hunted sambar, and also to hunting, trapping and poisoning of the tigers themselves. Tiger skins are readily obtainable in Bangkok where they fetch as much as US \$1,000 apiece. Most of these have come from Burma where they have been trapped, shot or poisoned with the highly toxic and widely available agricultural pesticide Endrin.*

Tiger in Burma are not yet seriously endangered, but they will be, as elsewhere in southeast Asia, unless positive steps are taken for their conservation.

ACTION PRIORITIES:

1. Place the tiger on the fully protected list of wildlife, except in cases of proven man-killing, with severe penalties for hunting or possession of skins;
2. Establish national parks or reserves in areas where there are still good populations of tigers and prey species;
3. Conduct an education campaign to convince the public that tigers are a beautiful and increasingly rare species, important in Burmese culture and tradition, and that they will inevitably disappear unless protected.

Saltwater Crocodile (Crocodylus porosus). Formerly widely distributed in estuaries and tidal swamps of Arakan, the Irrawaddy Delta and Tenasserim, crocodiles have been heavily hunted for skins and are now very seldom seen. Another major factor in their decline has been the loss of habitat due to extensive clearing of mangroves for rice cultivation. There are, however, apparently still viable populations in the Irrawaddy Delta where the People's Pearl and Fisheries Corporation (PPFC) collects an average of about 500 hatchlings a year for their crocodile farm in Rangoon. Also, there are still possibly viable populations in less disturbed coastal areas of Arakan and Tenasserim where there are still extensive areas of suitable habitat among the tidal creeks and mangrove swamps.

The PPFC has proposed that Meinmahla Kyun, an estuarine island about 130 km² in area in the Irrawaddy Delta, be declared a sanctuary for this species. The crocodile population is, however, very small with no sign of breeding. Restocking from the crocodile farm will therefore probably be necessary.

ACTION PRIORITIES:

1. Full legal protection for this species, except for the collection of a limited number of hatchlings by PPFC under permit;
2. Heavy penalties for possession of crocodile skins;
3. Establishment of Meinmahla Kyun as a sanctuary for protection of crocodiles with restocking as necessary;
4. Surveys in Arakan and Tenasserim to obtain data on status and distribution, and identify suitable conservation areas.

Marine Turtles. The five species of marine turtles reportedly occurring in Burmese coastal waters are as follows:

- Green turtle (*Chelonia mydas*) — Commonest species on Thamihla Kyun.

- Olive ridley (*Lepidochelys olivacea*) — Fairly common off the Irrawaddy Delta.
- Loggerhead (*Caretta caretta*) — Status uncertain, but reported to be fairly common in the Delta region.
- Hawksbill (*Eretmochelys imbricata*) — Rare.
- Leatherback (*Dermochelys coriacea*) — Very rare.

There are turtle nesting beaches along the coast and on certain offshore islands in Arakan, the Irrawaddy Delta and Tenasserim, of which the most important appear to be Thamihla Kyun (Diamond Island) off the mouth of the Bassein River, Kadonly and Gayedgyi Islands off the mouth of the Bogale River, and Aung Bok in the South Moscos Islands (Tenasserim).

Both Thamihla Kyun and the Moscos Islands are legally established Wildlife Sanctuaries, but nearly all the turtle eggs laid are taken from the former by the PPFC and from the latter by a local contractor with a Forest Dept. license. Eggs are also taken from all other known nesting sites.

Past records show that at the beginning of this century 1.5-2 million eggs a year were being harvested from Thamihla Kyun. The average annual offtake today is only about 150,000, a 90% reduction. Many former nesting beaches are no longer visited by any turtles. Apart from egg collection, mature turtles are taken by fishermen, reportedly including PPFC trawlers which catch them in their nets. Hawksbill turtles are killed for their "tortoise shell".

From the enormous reduction in the number of eggs collected from Thamihla Kyun and elsewhere and the fact that many of the formerly well known nesting beaches are now unused, it is clear that turtle populations have declined markedly and that two species, the leatherback and the hawksbill, are endangered while the other three species must be considered seriously threatened. Leatherbacks are so rare that their occurrence should perhaps be considered accidental.

ACTION REQUIRED:

1. Establish Thamihla Kyun and South Moscos as effective wildlife sanctuaries and stop all collection of turtle eggs. South Moscos has been proposed as a future national park and has been approved in principle. Its designation as a park will, however, have to wait introduction of new legislation;
2. Declare Kadonly Kyun a wildlife sanctuary and provide sufficient staff, boats, etc., to protect it and the other two sanctuaries mentioned above. It appears that Kadonly Kyun attracts mainly olive ridley and the other two islands mainly green turtle;
3. Enlist cooperation of PPFC in not trawling in areas immediately seaward of sanctuaries and in releasing any turtles accidentally caught in nets; and
4. Survey by experienced marine biologist to determine the status and distribution of marine turtles in Burmese waters and to recommend further conservation action.

River Terrapin (Batagur baska). This endangered species still occurs in the Irrawaddy Delta and is reported to nest on certain of the offshore islands and sandbanks, including Kadonly Kyun, which has been proposed as a wildlife sanctuary. However, both the terrapin itself and the eggs are taken wherever they are found. The species is now very rare in Burmese waters and without effective conservation measures is likely to become extinct within the foreseeable future.

ACTION REQUIRED:

1. Full protection of both the terrapin and its eggs;
2. Establishment of Kadonly Kyun as a wildlife sanctuary;
3. Survey by a marine biologist to determine status and distribu-

*Note: The Government of Burma has recently prohibited further importation of Endrin and less toxic pesticides are being introduced in its place.

tion (combined with a marine turtle survey) and to recommend further conservation action, including a possible hatchery on Kadonlay Kyun or elsewhere.

Conclusion

Burma is a country of unusual ecological diversity, rich in a wide variety of flora and fauna. But, as elsewhere, the natural environment is increasingly threatened by shifting cultivation, illegal hunting, uncontrolled use of highly toxic pesticides and other harmful influences resulting from steady growth of the human population. Satellite monitoring shows that forest cover, though still greater in proportion to the total land area than in most south-east Asian countries, is diminishing at a steady rate. The Javan rhinoceros has already become extinct here, and other species, including the economically important elephant, marine turtles and saltwater crocodile, are seriously threatened.

The Government, having realized that effective conservation action is urgently needed, has, with UNDP/FAO assistance, initiated a nature conservation program which will include new legislation and establishment of national parks and other protected

areas. Several suitable sites have already been identified in addition to the 14 wildlife sanctuaries already in existence.

Provided that viable populations of those species known to be threatened or endangered are effectively protected, together with sufficiently extensive areas of their habitat, their survival should be assured. Otherwise, they will inevitably go the same way as the Javan rhinoceros.

Though much work yet remains to be done, particularly in field research to determine the status and distribution of individual species, the broad basis for an effective nature conservation program now exists. Continued external assistance will be needed for some years, but ultimate responsibility for implementation of this program necessarily rests with the Burmese government.

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Table 1. Burma
 Biogeographical Subdivisions Showing Distribution of Protected Areas, Existing and Proposed

Map Ref. No.	Designation	Major rare, vulnerable or endangered species	Existing	Protected Areas		Area (km ²)
				Area (km ²)	Proposed	
1.	NORTH KACHIN	Takin, musk deer, wolf, red panda, elephant, rhinoceros (?), tiger, several pheasant species	Nil		Nil	
2.	SOUTH KACHIN/ UPPER CHINDWIN	Elephant, gaur, tiger, rhinoceros (?), Sarus crane	TAMANTHI W.S. PIDAUNG W.S.	2150 705	Nil	
3.	CHIN HILLS	Elephant (scarce), gaur, tiger	Nil		NAIMI TAUNG (Mt. Victoria) N.P. KYAUKPANDAUNG N.P.	363 132
4.	LOWER CHINDWIN	Elephant, thamin, gaur, banteng, tiger, wild dog	KYATTHIN W.S.	268	ALAUNGDAW KATHAPA N.P.	1606
5.	SHAN PLATEAU	Elephant, gaur, banteng, tiger, wild dog, Sarus crane	MAYMYO W.S. SHWE-U-DAUNG W.S. TAUNGGYI W.S.	127 207 16	INLE AND MONGPAI N.R.	41
6.	ARAKAN (RHAKINE)	Elephant, gaur, banteng, tiger, wild dog, salt-water crocodile	Nil		Nil	
7.	DRY ZONE	Thamin, gaur, banteng (in foothills), wild dog	SHWEZETTAW W.S. WETHTIGAN W.S. MINWUN TAUNG W.S.	552 5 206	POPA MOUNTAIN PARK	96
8.	PEGU YOMA	Elephant, gaur, banteng, tiger, wild dog	Nil		PEGU YOMA N.P. MOHINGYI N.R. GYOBYU RECREATIONAL AREA	1461 104 34
9.	IRRAWADDY DELTA	Marine turtle, saltwater crocodile, river terrapin, Irrawaddy dolphin (?)	THAMIHILA W.S. (Diamond I.)	1	MEINMAHLA KYUN W.S. KADONLAY KYUN W.S.	130 3
10.	TENASSERIM	Elephant, gaur, banteng, Fea's muntjak, marine turtle, salt-water crocodile, Argus pheasant	KAHILU W.S. KELATHA W.S. MULAYIT W.S. MOSCOS W.S.	161 25 139 49	LAMPI N.P. PAKCHAN N.R.	233 1451

Note: N.P. = National Park. N.R. = Nature Reserve. W.S. = Wildlife Sanctuary.