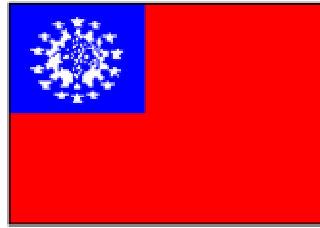


**Regional Environmental Technical Assistance 5771
Poverty Reduction & Environmental Management in Remote Greater Mekong Subregion (GMS)
Watersheds Project (Phase I)**



BIODIVERSITY AND PROTECTED AREAS

Myanmar

By

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1. BACKGROUND

1.1. Country profile

Myanmar lies on the western side of Indochina between latitudes 10⁰⁰' and 28³⁰' N, and longitudes 92¹⁰' and 101¹⁰' E, the northernmost areas lying outside the tropics. Its area is 677,000 km², making it the largest of the GMS countries. Elevations range from sea level to 5,881 metres on the snow-capped mountain of Kha Ka Borhazi in the extreme north. Most of the country comprises low lying plain along three parallel river systems, flanked by mountain ranges along the eastern and western frontiers.

Starting at the Northwest, Myanmar's neighbours are Bangladesh, India, China, Lao PDR and Thailand. To the west, along a 2,300-km coastline, is the Bay of Bengal. Several islands lie offshore.

Internally, Myanmar is divided into 14 administrative compartments called states and divisions, which are further sub-divided into districts. States are compartments in which minority races predominate (there are more than 100 such races); divisions are compartments in which Myanmar people form a majority.

Annual rainfall ranges from under 500 mm in the arid central zones to 6,000 mm in the wetter regions to the north and south. The cool season (mean temperature 16⁰C) extends from November to February, and the hot season (38⁰C) from March to October. Lower temperatures are recorded in mountainous country.

Three major river systems flow from north to south. The Chindwin rises from the Pataki Range on the frontier with India, the Irrawaddy from the mountains of the extreme north, and the Salween from China. Only about 21,000 km² of the country lie in the Mekong catchment: the river demarcates about 31 km of the border with China and 234 km with Lao PDR.

The estimated human population in 1995 was 46.5 million, and the annual growth rate 2.1 per cent. The 1999 population will therefore be about 50.5 million, making for a mean population density of 74.6/km².

Forest and woodland covers an estimated 47.9 percent, and arable land 14.2 per cent.

1.2 Biodiversity

Myanmar spans a vast area and has diverse geographical features and climates from tropical coral reefs to alpine habitats. It falls within six of Udvardy's (1975) global biounits, and nine sub-units of MacKinnon (1997).

Himalayas (12)	sub-unit East Himalayas (12d) The extreme northern tip
Burmese Coast (04)	not subdivided Along the coast except the extreme south
Coastal Indochina (05)	sub-unit Cardamom Mountains (05d) A narrow strip along the southerly borders with Thailand and Cambodia
Peninsular Malesia (07)	sub-unit Malay Transition (07b) A minute (0.6 per cent of the country) area in the extreme south

Central Burma (09)	sub-unit South Irrawaddy (09a)	Central areas including the major valleys
	sub-unit North Irrawaddy (09b)	Most northern areas
	sub-unit Burma Transition Zone (09c)	The east extending into India
Indochina (10)	sub-unit Central Indochina (10a)	The southeast along the border with Thailand
	sub-unit North Indochina (10b)	East-central areas bordering Thailand and Lao
	sub-unit Indochina Transition Zone (10c)	Very small areas (0.7 per cent of the country) on the border with Lao PDR

Myanmar is moderately rich in biological diversity. The Biodiversity Index is 6.8 (MacKinnon, 1997) – lowest of the five Indochina GMS countries. Endemism is also moderate.

One Endemic Bird Area occurs entirely in Myanmar - Irrawaddy Plains EBA. Three other EBAs occur in part: East Himalayas EBA, Yunnan Mountains EBA and Andaman Islands EBA shared with India. This study ignores the latter as it lies outside the GMS.

Irrawaddy Plains EBA extends across the lowlands (sea level to 1,000 metres) where there are distinct wet and dry seasons and the indigenous vegetation is tropical dry deciduous monsoon forest dominated by *Dipterocarpus* spp. There is also a small area of tropical thorn forest in the driest, central part. Two restricted range species occur: they are listed below with global status and habitat.

White-throated babbler (*Turdoides gularis*): **Least concern**
Thorn scrub, thickets and agricultural land.

Hooded treepie (*Crypsirina cucullata*): **Vulnerable**
Dry forest, scrub, agricultural lands and gardens.

A small portion of the Eastern Himalayas EBA lies in the north of the country along the borders with India and China. Most of this EBA lies well to the west as far as Nepal, and to the south into India. It is extremely rich in restricted-range species: Stattersfield *et al* (1997) listed 22, of which nine (see below) are distributed in northern Myanmar, southern Tibet and north-west Yunnan. Not all necessarily occur in Myanmar.

Blyth's tragopan (*Tragopan blythii*): **Vulnerable**
Unergrowth (especially bamboo) in evergreen forest and rhododendron forest between 1,800 to 3,300 metres.

Sclater's monal (*Lophophorus sclateri*): **Vulnerable**
Silver fir forest with rhododendron undergrowth, subalpine rhododendron scrub, rocky slopes and grassland between 3,000 to 4,000 metres, dropping to 2,500 in winter.

Ward's trogon (*Harpactes wardi*): **Vulnerable**
Broadleaf evergreen forest and bamboo between 1,500 to 4,200 metres.

Rusty-bellied shortwing (*Brachypteryx hyperthra*): **Vulnerable**
Broadleaf evergreen forest and bamboo between 1,800 to 3,000 metres (lower in winter).

Wedge-billed wren-babbler (*Sphenocichla humei*): **Near threatened**
Evergreen forest and bamboo between 900 to 2,300 metres.

Streak-throated batwing (*Actinodura waldeni*): **Least concern**

Broadleaf evergreen and mixed forest, rhododendron and bamboo forest between 2,400 to 3,300 metres, dropping to 1,500 in winter.

*Grey shia (Heterophasia gracilis): **Near threatened***

Evergreen and deciduous forest and pine forest between 1,400 and 2,800 metres, dropping to 900 in winter.

*Beautiful shia (H pulchella): **Least concern***

Mossy evergreen forest between 2,100 to 3,000 metres, dropping to 400 in winter.

*White-naped yuhina (Yuhina bakeri): **Least concern***

Broadleaf evergreen forest between 600 to 2,000 metres.

Yunnan Mountains EBA, which is chiefly in the Yunnan Province of China, extends into a small area of north-eastern Myanmar. Three restricted range species occur although not necessarily in Myanmar: they are listed below with global status and habitat.

*White-speckled laughing thrush (Garrulax bieti): **Vulnerable***

Bamboo thickets above 3,050 metres.

*Brown-winged parrotbill (Paradoxornis brunneus): **Near threatened***

Bamboo thickets, long grass, scrub and agricultural land between 1,500-3,650 metres.

*Yunnan nuthatch (Sitta yunnanensis): **Vulnerable***

Open pine forest above 2,440 metres.

Forest cover ranges from moist tropical rain forests in the south, through dry deciduous forest in central areas to temperate broad leaf and alpine forests to the north. The main forest types are listed below.

- **Mangrove forest:** In coastal areas and the Irrawaddy Delta.
- **Lowland rainforest:** In coastal areas and the Irrawaddy Delta.
- **Freshwater swamp forest:** In the Irrawaddy Delta and flood plains.
- **Stunted dry deciduous woodland:** In the central dry zone. A forest type known locally as *indaing*
- **Thorn scrub:** In the central dry zone.
- **Deciduous forest:** Around the periphery of the central dry zone. It includes the teak *Tectona grandis*, making this forest type of considerable economic importance.
- **Moist semi-evergreen forest:** At higher elevations around the central dry zone, and merging with the next types.
- **Evergreen montane forest:** On higher hills to the west, north and east.
- **Temperate oak forest:** At higher elevations to the north
- **Sub-alpine coniferous forest:** At higher elevations to the north
- **Sub-alpine vegetation:** Occurs on the highest elevations in the extreme north.

More than 7,000 flowering plants have been recorded of which about 1,000 are endemic. Known vertebrate animals include (Brunner *et al*, 1998):

- Mammals 251
- Birds (breeding spp) 867
- Reptiles 203

- Amphibians

70

Forty per cent of South-East Asia's highest priority tiger habitat lies in border areas of Myanmar.

There is an enormous invertebrate fauna, including 68 species of swallowtail butterflies.

Threatened species recorded in Myanmar, based upon November 1998 data from the WCMC, comprised 854 plants (833 excluding synonyms) and 261 animals. Numbers of threatened animals are listed below. Categories of threat follow those of IUCN.

Mammals (99)	Extinct	-
	Extinct in the wild	-
	Critically endangered	4
	Endangered	7
	Vulnerable	24
	Least risk	49
	Data deficient	15
	Not evaluated	-
Birds (124)	Extinct	-
	Extinct in the wild	-
	Critically endangered	2
	Endangered	6
	Vulnerable	38
	Least risk	77
	Data deficient	1
	Not evaluated	-
Reptiles (30)	Extinct	-
	Extinct in the wild	-
	Critically endangered	4
	Endangered	7
	Vulnerable	9
	Least risk	5
	Data deficient	5
	Not evaluated	-
Fishes (8)	Extinct	-
	Extinct in the wild	-
	Critically endangered	-
	Endangered	2
	Vulnerable	-
	Least risk	-
	Data deficient	-
	Not evaluated	-
Invertebrates (10)	Extinct	-
	Extinct in the wild	-
	Critically endangered	-
	Endangered	-

Vulnerable	2
Least risk	5
Data deficient	-
Not evaluated	3

The most highly threatened species (critically endangered and endangered), based upon information provided from the WCMC database, are listed below. Where appropriate, comments or corrections have been added based upon local information from relevant specialists.

Critically endangered

<i>Pipistrellus anthonyi</i>	(an endemic bat)
<i>Pjeffrei</i>	(bat)
<i>Dicerorhinus sumatrensis</i>	Sumatran rhinoceros (may be locally extirpated)
<i>Rhinoceros sondaicus</i>	Javan rhinoceros (may be locally extirpated)
<i>Rhodonessa caryophyllacea</i>	Pink-headed duck
<i>Pitta gurneyi</i>	Gurney's pitta
<i>Crocodylus siamensis</i>	Siamese crocodile
<i>Eretmochelys imbricata</i>	Hawksbill turtle
<i>Geoemyda depressa</i>	Arakan forest turtle
<i>Geochelone platynota</i>	Burmese starred tortoise

Endangered

<i>Panthera tigris</i>	Tiger
<i>Ailurus fulgens</i>	Lesser panda
<i>Balaenoptera musculus</i>	Blue whale
<i>B physalus</i>	Common roqual
<i>Elephas maximus</i>	Asian elephant
<i>Bos javanicus</i>	Banteng
<i>Hylopetes alboniger</i>	Particoloured flying squirrel
<i>Ardea insignis</i>	Imperial heron
<i>Ciconia boyciana</i>	Japanese white stork
<i>Leptoptilus dubius</i>	Greater adjutant
<i>Pseudibis davisoni</i>	White-shouldered ibis
<i>Cairina scutulata</i>	White-winged duck
<i>Tringa guttifer</i>	Nordmann's greenshank
<i>Caretta caretta</i>	Loggerhead
<i>Chelonia mydas</i>	Green turtle (highly endangered in Myanmar waters)
<i>Lepidochelys olivacea</i>	Olive ridley
<i>Dermochelys coriacea</i>	Leatherback
<i>Batagur baska</i>	Batagur
<i>Cuora trifasciata</i>	Chinese three-striped box turtle
<i>Kachuga trivittata</i>	Burmese roofed turtle (endemic)
<i>Scleropages formosus</i>	Asian arowana

Pangasianodon gigas

Giant catfish

A new species of muntjac was discovered in 1998, in low lying, flat country near the northern town of Putao in Kachin State. It has been named *Muntiacus putaoensis* (little leaf deer), and is believed to be endemic. It has not yet been given a global status rating.

2. BIODIVERSITY POLICY

Overall environmental management in Myanmar is entrusted to the National Commission on Environmental Affairs (NCEA). The Chairman is also Minister for Foreign Affairs, and the members are heads of technical departments concerned with the different issues relating to environmental conservation. NCEA is the focal point for international links in respect of environmental affairs

Four specialised committees report to the Commission.

- Committee on Conservation of Natural Resources.
- Committee on Control of Pollution.
- Committee on Research, Education and Information.
- Committee on International Cooperation.

The Commission has a staff bureau comprising personnel with backgrounds spanning a broad range of scientific disciplines. Its mandate is to provide advice to the Cabinet on formulating policy; issue guidelines for implementing policy; provide guidance and advice to regulatory agencies on legalistic matters; and to formulate policies and strategies that take into account environmental and developmental priorities.

One of the technical departments is the Ministry of Forestry, whose mandate includes the preservation of forests and biodiversity.

National Forest Policy 1995 has among its goals, '*to strengthen wildlife management through the establishment of a network of national parks, wildlife reserves and sanctuaries*'. A further goal is to expand the existing protected area system (see below) to encompass 5 per cent of land area, and ultimately 10 per cent. Brunner *et al* (1998) point out that this is a realistic ideal because large, well-forested and sparsely populated tracts of country exist in the north.

3. BIODIVERSITY LEGISLATION

3.1. State law

The historical record of biodiversity and protected area legislation in Myanmar (formerly Burma) has been reviewed by Thein Lwin (1998).

The first legal instrument, which designated a wildlife sanctuary in the environs of the Royal Mandalay City, was promulgated in 1859. The first piece of wildlife legislation to be enacted was the Wild Elephant Protection Act of 1879. The Asian elephant had long been regarded an indispensable tool in timber operations.

The Forest Act of 1902 gave responsibility for wildlife management to the Forest Department. Under this Act wild animals were a class of forest produce, and Forest Officers were empowered to control hunting.

Legislation specific to wild animals followed in 1927, and in the same year a Game Warden was appointed to supervise management in general and the capture of wild elephants in particular to strengthen the working force in the timber industry. Broader legislation followed nine years later with the Wildlife Protection Act of 1936. This provided for designation of wildlife sanctuaries with species-specific conservation objectives, and for three categories of protection for wild animals;

- completely protected;
- protected; and
- seasonally protected, to allow for traditional meat hunting.

Legislation was completely revised in 1994 with issue of the Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law. In summary the objectives of this law are:

- To implement the policy of protecting wild animals and wild plants.
- To implement the policy of conserving natural areas.
- To act in accordance with relevant international conventions to which Myanmar has acceded.
- To contribute towards natural history scientific research.
- To establish zoological and botanical gardens for the purpose of protecting wild plants and animals.

The 1994 Law, which was issued by the State Law and Order Restoration Council, has an authoritarian ring to it. It provides for:

- A Committee for the Protection of Wildlife and Wild Plants and Conservation of Natural Areas, which is to serve as an advisory body to the Minister of Forestry; supervise implementation of the Law; give guidance in matters of research, conserving species in danger of extinction and international cooperation.
- Categories of 'natural areas' and zoological and botanical gardens, their declaration and uses.
- Categories of protected wild animals (almost the same as provided for under earlier law): completely protected, normally protected and seasonally protected.
- Hunting licences.
- Establishment of zoological and botanical gardens.
- Registration of ownership of completely protected animals or trophies thereof.
- Administrative actions.
- Appeals.
- Offences and penalties.

The species allocated to the three categories of protection will be subject to review and revision as fresh information becomes available through a programme of biodiversity assessment and inventory has been completed. The current position is as follows.

Completely protected

- Mammals 39
- Birds 50
- Reptiles 9

Normally protected

- Mammals 12

- Birds 43
- Reptiles 6

Seasonally protected

- Mammals 2
- Birds 13

3.2. International conventions

Myanmar is signatory to:

- Convention on Biological Diversity.
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora.
- Convention on the Conservation of Migratory Species of Wild Animals.
- UN Convention to Combat Climate Change.

4. CATEGORIES OF PROTECTED AREAS

The categories of so-called 'natural areas' are defined in the Law described above as:

- Scientific nature reserve
- National park
- Marine national park
- Nature reserve
- Wildlife sanctuary
- Geo-physically significant reserve
- Other nature reserve determined by the Minister

In practice not all these names are used, and (in English translations, at least) other titles appear. The titles used in the protected area list supplied by the Forest Department (plus brief descriptions of what they are) follow.

- **National park.** Maintained for biodiversity conservation and representativeness. Firm management control. No settlement or resource harvesting allowed. Visitors permitted.
- **Marine national park.** The same as national park but in marine, island and coastal environments.
- **Wildlife sanctuary.** Species conservation. No settlement or resource harvesting allowed. Visitors permitted.

- **Bird Sanctuary.** As for wildlife sanctuary but birdlife conservation is paramount.
- **Wildlife Park.** Wild animals held in captivity and in the wild but on a fairly small range. For recreation and education. No settlement or resource harvesting allowed. Visitors encouraged.
- **Mountain park.** Maintained to conserve landscapes, geomorphological features and sites of religious significance. No settlement allowed. Visitors permitted, including pilgrims who are allowed to harvest limited supplies of natural resources – bamboo shoots, mushrooms and edible fruits.
- **Elephant range.** A means of conserving Asian elephant. Can include villages, and may overlap with other protected areas although the only one that exists at present does not overlap. Covers a range over which elephant herds move.
- **'Protected area'**. A misnomer adopted by the Planning & Statistics Division of the Forest Department, which failed to consult WNCD when drawing up the declarations. This is to be corrected, and the areas are likely to become wildlife sanctuaries.

There are in addition, under the Forest Law of 1992, reserved forests and protected public forests. Reserved forests are areas for which various uses may be designated. Thus, according to Chapter III of the Law, there can be:

- Commercial reserved forest (for commercial timber extraction)
- Local supply reserved forest (sources of non-timber forest products for local consumption)
- Watershed or catchment protection reserved forest
- Environment and biodiversity conservation forest
- Other categories of reserved forest.

According to Forest Department records (Government of Myanmar, 1998), there are 104,886 km² of reserved forest – about 15.5 per cent of total land area. Given the options listed above, some reserved forests may be assigned to protect watersheds and biodiversity, and, according to Forest Department spokesmen, this is precisely what the national parks, wildlife sanctuaries, etc. are, although the Consultant was shown no corroborative documentary evidence. Reserved forests that exist to protect watersheds and biodiversity are therefore assumed to make up the existing protected areas system provided for under wildlife law rather than be additional to it.

Protected forests may, according to Chapter III of the Law be disposed of for:

- Protection of water and soil
- Conservation of arid zone forests
- Conservation of mangrove forests
- Conservation of environment and biodiversity
- Conservation for sustainable production

Some protected forests may therefore also have watershed and biodiversity protective functions, and these may or may not be incorporated into the wildlife protected areas system. However, the Consultant was unable to obtain any firm evidence for this; neither was he able to discover the total area of protected forest.

Document research revealed a 460 km² 'Kaserdoh Wildlife Sanctuary' – one of 11 protected areas declared by the Karen National Union (a separatist movement); but no such name appears on Forest Department records, and it is not included in the inventory given below. According to Brunner *et al* (1998) Kaserdoh is

'a unique combination of riparian forest, extensive mineral springs and high altitude montane forest, and one of

the greatest natural areas left in Indochina (that was) designated to protect the habitat of the Sumatran rhinoceros. . . the tiger, tapir, clouded leopard and other vulnerable or endangered species, as well as the headwaters of three large tributaries of the Tenasserim. Kaserdoh forms part of the Kayah-Karen/Tenasserim Moist Forest habitat that the World Wildlife Federation considers to be one of the world's 136 most threatened terrestrial ecosystems'.

The same authors write of a government-proposed 'Myinmoletkat Nature Reserve', which would include Kaserdoh, but add that the Karen National Union have issued a declaration refusing to recognise any protected areas declared by the State Law and Order Restoration Council – the body that promulgates statutory law.

5. INSTITUTIONAL ARRANGEMENTS

5.1. State management

Formal forest management in Myanmar has a long history starting in 1856 with the Selection Forest Management System, and the current protected areas system dates back to 1918, when three of today's wildlife sanctuaries (Pidaung, Shwe-U-Daung and Pyin-O-Lwin) were first declared.

The Ministry of Forestry is the central government ministry responsible for biodiversity conservation and protected areas, within which the Forest Department (with a total staff of about 14,000) is the controlling agency. Implementation is by the Wildlife and Nature Conservation Division (WNCD) of the Department. The staff of the Division numbers about 850, of which 40 are based at the headquarters office in Yangon: about 10 per cent of the staff are graduates. Control over protected area management is exercised directly by the Division through local Forest Officers.

The Division claims to be under-funded and under-staffed (but what technical department does not?). Given a protected area system measuring a little over 14,000 km² (see below), 850 offers a better area/staff ratio than most other GMS countries although what staff there are seem to be deployed in a somewhat skewed manner. For example, Hlawga Wildlife Park, which covers a little over 6 km², has a staff of 100, while Rakhine Yoma Elephant Range (1,295 km²) has an establishment for 81 of which only 11 posts are filled. There are of course reasons for the heavy staffing of Hlawga: it is close by Yangon in a densely crowded area and requires intensive management of animals kept under relatively closely confined conditions.

Management plans do not appear to exist. Some staff members speak of 'master plans' but these appear not to be plans that define objectives, prescribe strategies, set targets and serve as practical management manuals for Wardens-in-charge. Management is reported to be on an *ad hoc*, opportunistic basis, Wardens responding to instructions that are issued from time to time after inspection visits by senior staff.

Revenue earned from protected area management is passed to Forest Department headquarters and from there to the central government treasury. Nothing is retained for management.

5.2. NGO and donor involvement

Several NGOs and institutions have been and are assisting biodiversity conservation and protected area management.

From 1981 to 1984, a programme called the Nature Conservation and National Parks Project was supported by FAO and UNDP. The objectives were to conduct field surveys and identify potential protected areas. Brunner *et al* (1998) report that several promising sites were located in the northern half of the country, which were inaccessible for reasons of security. However, subsequent plans were shelved because of government insistence that a large part of the budget be spent on road construction, to which FAO and UNDP would not agree.

In recent years, IUCN's Asian Elephant Specialist Group has held courses for in-service staff in census methods and elephant biology, as has also the Asian Rhinoceros Specialist Group (a training course in Malaysia).

The Smithsonian Institution has supported capacity building through training in Myanmar and the USA.

The Wildlife Conservation Society has:

- given training in methods of terrestrial and marine wildlife surveying;
- assisted conservation of selected species;
- raised funds for crocodile conservation;
- made studies of Sumatran rhinoceros and habitats in Htamanthi Wildlife Sanctuary; and
- in conjunction with the US Fish & Wildlife Service, is about to start a three-year tiger census leading to a national tiger conservation action plan.

WWF has raised funds for staff capacity building.

The only local NGO is the Forest Resources & Environmental Development Association (FREDA), which has been assisted with funding from Japan to support wildlife research.

Other organisations that have supported the work of WNCD include:

- California Academy of Science;
- International Centre for Integrated Mountain Development; and
- Global Tiger Forum.

5.3. Private sector involvement

Private sector involvement is slight. In a few protected areas, staff family members are allowed to run small business, selling food and other minor items to visitors.

Only in Popa Mountain Park and Moyungi Wetland Bird Sanctuary is the private sector permitted to manage visitor accommodation facilities.

6. INVENTORY OF PROTECTED AREAS

The inventory that follows is based upon a list and map provided by NCWD. There are marked differences between these and the protected areas illustrated on a map of Myanmar in MacKinnon (1997). The latter shows a few areas that do not appear on NCWD's list, while NCWD's list includes many names not recorded by MacKinnon. As MacKinnon's list was based upon WCMC data, nine areas that were declared during or after 1996 were probably not included.

National parks (IUCN management category II)

	<u>Size (km²)</u>
Alaungdaw Kathapa	1,606
Namataung	722
<u>Total national parks</u>	<u>2,328</u>

Marine national park (IUCN management category II)

	<u>Size (km²)</u>
Lampi Island	205

Wildlife sanctuaries (IUCN management category IV)

	<u>Size (km²)</u>
1. Chatthin	269
2. Htamanthi	2,151
3. Kahilu	107
4. Kelatha	24
5. Kyaikhtiyoe	181
6. Lawkananda	0.5
7. Meinmahla Kyun	137
8. Mingon Taung	202
9. Minwuntaung	206
10. Moscos Islands	49
11. Mulayit	139
12. Panlaung & Padalingu	327
13. Pidaung	698
14. Shwe-U-Daung (Mandalay Div)	207
Shwe-U-Daung (Shan State)	119
15. Shwesettaw	553
16. Thamihla Kyun	<u>0.9</u>
<u>Total wildlife sanctuaries</u>	<u>5,370</u>

Bird sanctuaries (IUCN management category IV)

	<u>Size (km²)</u>
1. Inle Wetland	642
2. Moyungi Wetland	104
3. Pyin-O-Lwin	127
4. Taunggyi	16
5. Wethtikan	5
<u>Total bird sanctuaries</u>	<u>894</u>

Wildlife park (IUCN management category II)

	<u>Size (km²)</u>
1. Hlawga	6

Mountain park (IUCN management category V)

	<u>Size (km²)</u>
1. Popa	129

Elephant range (IUCN management category IV)

Size (km²)

1. Rakhine Yoma 1,295

Protected areas (that will probably be renamed wildlife sanctuaries, and therefore in IUCN management category IV)

	<u>Size (km²)</u>
Hkakabo-Razi	3,812
Loimwe	43
Parsar	78
<u>Total 'protected areas'</u>	<u>3,933</u>

7. CONSERVATION COVER BY PROTECTED AREAS

The extant protected area system covers 2.1 per cent of the country – the lowest national coverage for the GMS. All categories except mountain parks are in the range of IUCN management categories I-IV. Total areas under all categories are so small that percentage cover has been calculated to two decimal places. Total percentage cover is set to one decimal place as for the other GMS countries.

National parks	2,328 km ²	0.34 per cent
Marine national park	205 km ²	0.03 per cent
Wildlife sanctuaries	5,370 km ²	0.79 per cent
Bird sanctuaries	894 km ²	0.13 per cent
Wildlife park	6 km ²	0.00 per cent
Mountain park	129 km ²	0.02 per cent
Elephant range	1,295 km ²	0.19 per cent
Protected areas	3,933 km ²	0.58 per cent
Total	14,160 km ²	2.1 per cent

Of the 10 biogeographic subunits (see Section 1.2) eight are represented in protected areas. The two unrepresented are both very small areas that extend across the border from Thailand.

- 5d: Cardamom Mountains
- 10c: Indochina transition

Mackinnon (1997) noted, on the basis of a protected area system half the size of today's, that gaps occurred in almost all habitats and biounits. This has been partially repaired, especially by the inclusion of alpine and subalpine habitats in the north. The extant system is still however relatively small and offers limited scope for long-term retention of large mammals.

8. AREAS OF MAJOR BIODIVERSITY SIGNIFICANCE

Based upon reports by Forest Department spokesmen and the report by Brunner *et al* (1998), four areas were chosen as being of major importance.

Alaungdaw Kathapa National Park

The most undisturbed protected area in the system. It is relatively large and covers a wide range of habitats and biodiversity.

Chatthin Wildlife Sanctuary

A refuge for Eld's deer. It was once subject to commercial timber extraction but this was stopped and the area is being rehabilitated.

Shwesettaw Wildlife Sanctuary

A refuge for Eld's deer.

Kaserdoh (not a protected area)

An area of high mountain with montane forest, extensive mineral springs and fine scenery. Originally a refuge for Sumatran rhinoceros, which is now believed now to be locally extirpated. Tiger, leopard and tapir still occur.

9. TOURISM IN PROTECTED AREAS

Visitors to Myanmar's protected areas include those who come to see the biotic and abiotic features and landscapes, for recreation, and those who come on religious pilgrimages to shrines and sacred caves and to meditate.

There is a dearth of records to show numbers of visitors, and as pilgrims do not use formal entrances there is no means of counting them. Where visitor volume is recorded along with revenue earned, the data do not appear to be stored in a readily retrievable manner. Therefore it is not possible to give a meaningful account of visitors to protected areas. The same applies to all other GMS countries except Thailand.

Data for two protected areas that are heavily visited were given verbally to the consultant. Hlawga Wildlife Park, which is close to Yangon, was reported to average 400 visitors a day over a five-day week (the park is closed on Mondays and Tuesdays) suggesting an annual through-flow of about 104,000. Another area (Popa Mountain Park) was reported to receive about 150,000 visitors a year. These are the two most visited protected areas.

10. COMMUNITY PARTICIPATION

Unique among the GMS countries, Myanmar's Forest Department reports that there are no settlements in its protected areas except for the category elephant range. There are, however, settlements in close proximity to many areas and encroachment, or attempted encroachment, is said to be a constant threat that has to be guarded against vigilantly, as also are poaching and gathering of non-timber forest products.

Existing policy statements appear not to include community participation as a theme linked to protected area management; and neither Forest Law nor Wildlife, Wild Plants & Conservation of Nature Areas Law address the subject.

There is no office within WNCN that promotes community participation although the Division does conduct public awareness programmes that aim to foster support for nature conservation.

11. GENDER

Out of 850 employees in WNCN about 200 are women. This is the highest proportion found in the GMS countries, and is said to be higher than the proportions recorded in other divisions of the Forest Department.

12. CROSS BOUNDARY ISSUES

12.1 Internal boundaries

Some protected areas cross state, division or district boundaries. The most obvious example is Shwe-U-Daung Wildlife Sanctuary, which straddles the Mandalay Division and Shan State border. WNCD staff reports that this raises no problems because control is exercised by the Forest Department without need to defer to local government authorities.

12.2. International borders

Two protected areas lie adjacent to international borders but do not adjoin protected areas in neighbouring countries.

Adjoining India and China (Tibet and Yunnan Province)

Hkakabo-Razi Protected Area

Adjoining Lao

Pasar Wildlife Sanctuary

On small-scale maps, Mulayit Wildlife Sanctuary appears to lie adjacent to Thailand but at larger scales it becomes clear that a few kilometres separate it from the frontier.

12.3. Cross border trade

A large volume of wildlife products passes from Myanmar to the Yunnan Province of China (U Tin Than, 1998). The commonest species whose by-products (in some cases live animals) are recorded include tiger, leopard and other wild cats; elephant, bear, otter, pangolin, deer and wild cattle; various birds, including parrots and raptors; turtles, snakes and monitor lizards; orchids and numerous medicinal plants. Although considerable quantities are used in Myanmar for culinary and medicinal purposes, much passes on to China.

Major sources are forested areas of the western and north-western mountains. Trade routes lead to Mandalay from all directions, then northeast via the Musae Pass and on to the cities of Shweli and Wantain in the extreme southwest of Yunnan Province, from where they continue eastwards to Kunming and beyond. Lesser trade routes enter Thailand by way of Tachilek and Maesod.

This trade continues unchecked in spite of the fact than Myanmar is a signatory to CITES.

The economic value of wildlife products to traders is considerable. Some examples cited by U Tin Than (1998) are;

Tiger bone	\$63/kg
Tiger skin	\$400-\$500 in Mandalay, \$1,000 in China
Tiger claw	\$50
Tiger whole body	\$2,000
Elephant ivory	\$26/kg
Bear gall bladder	\$50 for 0.02 g
Pangolin live	\$100
Otter skin	\$40-\$100
Otter penis, dried	\$4-\$50/inch
Python live	\$300

Python gall bladder	\$300-\$500
Turtles	\$2-\$4/kg
Eagles live	\$150

The latter figure is extremely low compared with prices paid for good birds of prey in the Middle East, where they are used for falconry.

13. MAJOR PROBLEMS AND ISSUES

Political instability

Separatist movements render some areas of the country unmanageable (MacKinnon, 1997). This has hampered progress in designating additions to the protected area system and in enforcing existing legislation. For example, Brunner *et al* (1998) reported tensions between central government and the Karen National Union over protected area declarations in Karen State (see also Section 4).

Public indifference

Rural inhabitants in general are not in sympathy with government attempts to manage protected areas and conserve biodiversity, or are completely unaware of why these initiatives are being taken. Many groups are downright antagonistic towards *any* government action.

Encroachment on forests

Encroachment leading to loss of habitat is widespread, including inside wildlife protected areas, the reason being to open land for permanent or shifting cultivation.

Unsustainable harvesting

Increasing pressure is placed on forests, including protected wildlife areas, by demands for firewood and other non-timber forest products. Poaching is a major problem in many areas. Wild animals are harvested for local consumption and to support a lucrative cross border trade, chiefly with China.

Logging

Forests are under increasing pressure by demands for timber. Most protected wildlife areas have suffered or are suffering damage from logging. A switch in recent years towards logging evergreen dipterocarp forest threatens moist tropical forest, and intensified teak removal threatens biodiversity in mixed deciduous forest. Unsustainable harvesting in the dry central zone has led to severe deforestation but the most northerly forests are reported to be virtually intact.

Inadequate protected areas

Although eight of the ten biounits (see Section 1.2) are represented, and four protected areas are larger than 1,000 km² (one more than 3,000), most are too small to conserve effectively the biounits and forest types that are represented. The average size of the smaller 26 areas is 204 km², which is too low to retain viable populations of larger mammals over the long-term. Proposals tabled by the FAO/UNDP project of 1981 to 1984 remain largely unimplemented.

There are no management plans that define objectives, prescribe strategies and set targets. Management is reportedly conducted on an *ad hoc*, opportunistic basis.

Inadequate management resources

NWCD has insufficient financial and manpower resources and equipment to manage existing protected areas and guard against encroachment, poaching and gathering of non-timber forest products.