Biodiversity and Protected Areas

Viet Nam

By

J E Clarke, PhD

Contents

1 BACKGROUND 3
1.1 Country profile 3
1.2 Biodiversity 4
2 BIODIVERSITY POLICY 13
3 BIODIVERSITY LEGISLATION 15
3.1 State law 15
3.2 International conventions 16
4 CATEGORIES OF PROTECTED AREAS 16
5 INSTITUTIONAL ARRANGEMENTS 17
5.1 State management 17
5.2 NGO and donor involvement 18
5.3 Private sector involvement 19
6 INVENTORY OF PROTECTED AREAS 20
7 CONSERVATION COVERAGE BY PROTECTED AREAS 23
8 AREAS OF MAJOR BIODIVERSITY SIGNIFICANCE 24
9 TOURISM IN PROTECTED AREAS 25
10 COMMUNITY PARTICIPATION 26
11 GENDER 26
12 CROSS BOUNDARY ISSUES 27
12.1 Internal boundaries 27
1. BACKGROUND

1.1 Country profile

Viet Nam occupies a narrow sinusoid band of country along the east coast of Indochina, between latitudes 8º30’ and 23º25’ N, and longitudes 102º10’ and 109º25’. Its total area is 332,000 km². Most of the country is hilly or mountainous. Elevations range from sea level to over 3,000 metres on the Hoang Lien Son range in the north-west.

Along its western, inland border, Vietnam’s neighbours are Lao PDR and Cambodia. To its north is China, to the south and east the South China Sea or Gulf of Tonkin.

Mean annual rainfall is about 2,000 mm: higher in some central areas, where it may reach 3,000 mm, and lowest along the south-east coast, 500 mm. There are three monsoons: a cool winter monsoon from the north-east, which affects only northern areas; and south-east and western summer monsoons that bring rain from the sea. Mean annual temperatures fluctuate between 27ºC in the south to 21ºC in the north.

Two major rivers enter the country and form extensive deltas on the coast: the Red River to the north, and the Mekong River in the south. There are no large lakes.

The estimated human population in 1993 was 71.3 million. During the course of the current study, 75 million was commonly cited as being more realistic. Given, however, an annual growth rate that reportedly exceeds 2 percent, the 1999 population would be nearer 80 million, suggesting a human population density of 241/km², significantly (although not unexpectedly) higher than the 220/km² cited in the 1995 Biodiversity Action Plan (BAP).

Arable land makes up 16.6 percent of Viet Nam; about 80 percent of the population are engaged in some form of agriculture. Forest cover is estimated at 28 to 29 percent although some sources assert that this includes plantations of exotics and degraded forest. Dillon & Wikramanayake (1997b) claim that only 10 percent bears good quality original forest. About 40 percent of the country is barren land.

1.2 Biodiversity

Viet Nam falls within four of Udvardy’s global biounits, and 10 sub-units of MacKinnon (1975).

- **South China** (06)
  - sub-unit South China Mainland¹ (06a)
    - In the northeast, east of the Red River Delta and extending into China

- **Indochina** (10)
  - sub-unit Central Indochina (10a)
    - An area in the south bordering Cambodia
  - sub-unit North Indochina (10b)
    - Most of the northwest, west of the Red River Delta
  - sub-unit Indochinese Transition (10c)
    - The extreme northwest extending into Lao PDR and China

- **Coastal Indochina** (05)
  - sub-unit Mekong Delta (05a)
    - The most southerly corner around the Mekong Delta
Viet Nam is moderately rich in biological diversity. The Biodiversity Index is 8.5 (MacKinnon, 1997). Rates of endemism are high in some taxa. For example, 50 percent of known flora, and 38 percent of freshwater fish in northern Viet Nam. Endemism is especially high in sub-units -Ma and -Mb.

Viet Nam is the tenth most important country in the world for bird endemism (Slattersfield et al., 1998). There are three Endemic Bird Areas: Annamese Lowlands EBA, South Vietnamese Lowlands EBA and Da Lat Plateau EBA.

The Annamese Lowlands EBA is the most acutely threatened of the three. It extends across the lowlands and foothills of north-central Viet Nam between 16° and 21° N. A small extrusion reaches a little way into Lao PDR (see report for that country). In this area, most protected areas are in the highlands and very little lowland forest is included. The original plant cover was tropical lowland evergreen and semi-evergreen rain forest below 1,000 metres, and tropical montane rain forest above. The lowlands have been almost entirely deforested leaving only fragmented patches of degraded and some good quality forest remaining in the foothills. Nine restricted range species occur: they are listed below with global status and habitat.

Annam partridge (*Arborophila merlini*): **Endangered**.
Lowland evergreen forest up to 600 metres.

Imperial pheasant (*Lophura imperialis*): **Critical**.
Lowland evergreen forest up to 200 metres.

Edward's pheasant (*L edwardsi*): **Critical**.
Lowland evergreen forest, 300-600 metres.

Vietnamese pheasant (*L hatinhensis*): **Endangered**.
Lowland evergreen forest up to 200 metres

Crested argus (*Rheinardia ocellata*): **Vulnerable**.
Lowland evergreen forest up to 1,500 metres

White-cheeked laughingthrush (*Garrilax vassali*) **Least concern**.
Evergreen forest edge, secondary growth, scrub, grassland, edges of cultivation, 600-900 metres.

Short-tailed scimitar-babbler (*Jabouilleia danjoui*): **Vulnerable**.
Undergrowth in lowland evergreen forest and bamboo, 50-900 metres.

Sooty babbler (*Stachyris herberti*): **Vulnerable**.
Forest on limestone outcrops at about 200 metres.

Grey-faced tit-babbler (*Macronous kelleyi*): **Near threatened**.
Lowland evergreen forest and bamboo, 50-700 metres.
The **South Vietnamese Lowlands EBA** occupies the lowlands and foothills of Dong Nai, Song Be and Lam Dong Provinces, and probably beyond. The original plant cover was tropical semi-evergreen rain forest below 1,000 metres, with tropical montane forest above. Three restricted range species occur: they are listed below with global status and habitat.

- **Orange-necked partridge** (*Arborophila davidii*): **Critical**
  Evergreen forest, bamboo and scrub up to 250 metres.

- **Germain's peacock pheasant** (*Polyplectron germaini*): **Vulnerable**
  Lowland evergreen and semi-evergreen forest; locally in montane evergreen forest; up to 1,200 metres.

- **Grey-faced tit-babbler** (*Macronous kelleyi*): Near threatened
  Lowland evergreen forest and bamboo, 50-700 metres.

The **Da Lat Plateau EBA** includes the southern Vietnamese highlands in Lam Dong Province, parts of Dak Lak Province and probably in Ninh Thuan Province. Elevations extend up to 2,440 metres. The vegetation is tropical montane evergreen forest and pine forest. Eight restricted-range species occur, several also occurring in the previously described EBA. They are listed below with global status and habitat.

- **Crested argus** (*Rheinardia ocellata*): **Vulnerable**.
  Montane evergreen forest, 1,700-1,900 metres

- **Black-hooded laughingthrush** (*Garrulax vassali*): **Vulnerable**
  Montane evergreen forest, 800-1,650 metres

- **White-cheeked laughing thrush** (*Garrilax vassali*): Least concern
  Montane evergreen forest edge, secondary growth, scrub, grassland, edges of cultivation, 900-1,900 metres

- **Collared laughingthrush** (*Garrulax yersini*): **Vulnerable**
  Dense undergrowth in montane evergreen forest, 1,500-2,440 metres

- **Short-tailed scimitar-babbler** (*Jabouilleia danjoui*): **Vulnerable**
  Undergrowth in montane evergreen forest and bamboo, 800-2,000 metres.

- **Grey-crowned crocias** (*Crocias langbianis*): **Critical**
  Montane evergreen forest, 1,000-1,450 metres

- **Yellow-billed nuthatch** (*Sitta solangiae*): **Vulnerable**
  Montane evergreen forest, 1,100-2,100

- **Vietnam greenfinch** (*Carduelis monguilloti*): Near threatened
  Pine forest, mixed pine and montane evergreen forest, agricultural land, 1,050-1,950 metres

Originally Viet Nam was a land of forests but human activity; commercial logging, fuelwood collection, expanding agriculture and war have transformed most. Biodiversity has been greatly eroded.

Nine original vegetation types are identified and described in the BAP.

- **Mangrove forest**: Tall complex systems in the south; rather stunted simpler systems in the north.
- **Melaleuca forest**: Secondary forests derived from peat swamp forest. In the Mekong Delta; possibly also in the Red River Delta.
- **Freshwater swamp forest**: Subject to periodic inundation. Mostly in low lying southern areas and small areas in the north.
- **Monsoon forest**: Dry dipterocarp forests of central highlands and some coastal dry forests in the southeast.
- **Lowland evergreen/semi-evergreen broadleaf forest:** Tropical in the south; sub-tropical in the north. Very few areas remain in original condition.

- **Hill evergreen/semi-evergreen broadleaf forest:** Still found in scattered areas in several provinces.

- **Forest on limestone:** Being on areas unsuitable for cultivation, most of this forest type survives but is being degraded by fire, wood gathering and mining.

- **Montane evergreen and mixed coniferous forest:** Mostly in Dalat Plateau, central mountains and northern Hoang Lien Son range. Marked regional variations. High levels of regional endemism.

- **Sub-alpine vegetation:** Highest mountains only, especially Hoang Lien Son range.

Over 7,000 species of plants have been recorded in Viet Nam. The proportion of endemics has been variously recorded as 33 and 40 percent (from 2,310 to 2,800 species) (see BAP), and as 50 percent (3,500 species) (Thai van Trung, 1970). The foci of plant endemism are the three largest mountain ranges—Hoang Lien Son, Dalat Plateau and Central Highlands.

BAP reported that agricultural, forestry and marine products derived from biodiversity resources contribute US$2 billion annually to Viet Nam's revenue. Three quarters of national energy needs come from fuelwood—an estimated 22 to 23 tonnes each year. An estimated 2,300 species of wild plants and animals are used for medicines, food (for humans and livestock) and to support industries and handicrafts. Many of these resources leave the country, especially to China. See section 12.3 for further observations on trade in wildlife and their by-products.

Viet Nam is still relatively rich in animal diversity. Over 3,800 vertebrate species have been recorded (MacKinnon, 1997).

- Mammals 275
- Birds 800
- Reptiles 180
- Amphibians 80
- Fishes 2,470

Three large mammals recently discovered to science are small dark muntjac (*Muntiacus truongsonensis*), giant muntjac (*Megamuntiacus (Muntiacus) vuquangensis*) and saola (*Pseudoryx nghetinhensi*). They are endemic to the Annamite range along the border between Lao PDR and Viet Nam.

There will be a far greater abundance of invertebrate species but they have not been subject to intensive study. Information on biomes/biotic communities, and on special interest species is said to be good in respect of vertebrate fauna and vascular plants, based especially on studies made by the Institute of Ecology and Biological Resources. But most of the data are written in Vietnamese only. Some reports have been translated into English, and may be found in the IUCN (Hanoi) library.

The continued survival of several large mammals is in serious doubt, exacerbated by the erosion of forest habitats. About 150 tigers may remain. Estimates for Asian elephant are 200 or less, plus 100 non-breeding, captive, working animals. Most wild elephants occur in the north-west near China and Lao PDR. The captives (in Yok Dan National Park) are used as working animals for part of the year. During the off-season they are released with leg chains, when they become semi-feral. Each year they are rounded up again and put to work.

Wild buffalo (difficult to distinguish from domestics) may have been extirpated. Kouprey has gone; so has sika deer from the wild although a few are held in captivity. Sumatran rhino (the last remaining individuals belonging to the mainland sub-species) are down to less than 10 and must be regarded as close to extinction.

Since 1950, Cuc Phoung, Viet Nam's oldest national park, has lost four large mammals and two large birds: tiger, leopard, sika deer, sambar deer, white-cheeked gibbon, great hornbill and peafowl.

Threatened species recorded in Viet Nam, based upon November 1998 data from the WCMC, comprised...
1,519 plants (1,485 excluding synonyms) and 230 animals. Numbers of threatened animals are listed below. Categories of threat follow those of IUCN.

<table>
<thead>
<tr>
<th>Category</th>
<th>Mammals (82)</th>
<th>Birds (111)</th>
<th>Reptiles (24)</th>
<th>Amphibians (1)</th>
<th>Fishes (5)</th>
<th>Invertebrates (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extinct</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Extinct in the wild</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Critically endangered</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Endangered</td>
<td>10</td>
<td>9</td>
<td>3</td>
<td>-</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Vulnerable</td>
<td>21</td>
<td>33</td>
<td>7</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Least risk</td>
<td>28</td>
<td>62</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Data deficient</td>
<td>14</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>
The most highly threatened species (extinct, 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.

**Extinct**

*Sus bucculentus*  
Viet Nam warty pig (Has been rediscovered in Lao PDR and probably survives in Viet Nam: J W Duckworth, *pers com*)

**Critically endangered**

*Euroscaptor parvidens*  
(an endemic bat)

*Paracoelops megalotus*  
(an endemic bat)

*Rhinopithecus avunculus*  
Tonkin snub-nosed monkey

*Trachypithecus delacouri*  
White-rumped black lemur

*Dicerorhinus sumatrensis*  
Sumatran rhinoceros

*Rhinoceros sondaicus*  
Javan rhinoceros (locally extinct)

*Bos sauveli*  
Kouprey (believed to be locally extinct)

*Typhlomys chapensis*  
(an endemic mouse)

*Gorsachius magnificus*  
White-eared night-heron

*Platalea minor*  
Black-faced spoonbill

*Arborophila davidi*  
Orange-necked partridge

*Lophura edwardsi*  
Edward's pheasant

*L imperialis*  
Imperial pheasant

*Crocias longbianis*  
Grey-crowned crocias

*Crocodylus siamensis*  
Siamese crocodile

*Eretmochelys imbricata*  
Hawksbill turtle

**Endangered**

*Pygathrix nemaeus*  
Douc langur

*Trachypithecus poliocephalus*  
(an endemic lemur)

*Hylobates concolor*  
Black gibbon

*Panthera tigris*  
Tiger

*Cynogale bennetti*  
Otter-civet

*Elephas maximus*  
Asian elephant

*Bos javanicus*  
Banteng

*Pseudonovibos spiralis*  
Linh-duong

*Pseudoryx nghetinhensis*  
Saola

*Hylopetes alboniger*  
Particoloured flying squirrel

*Egretta eulophotes*  
Chinese egret

*Leptoptilus dubius*  
Greater adjutant
2. BIODIVERSITY POLICY

Several policy initiatives have been taken that relate to biodiversity conservation.

National Conservation Strategy

In June 1985, Viet Nam adopted a National Conservation Strategy (NCS). This document stressed that it was not a 'fringe or luxury document' but 'a strategy for national survival'. It emphasised the pressing need to reduce human population growth to zero, and increase forest cover to ensure improved soil and water conservation, flood control and siltation.

The NCS recognised that environmental problems could not be addressed by government action only. Cooperation of the people of Viet Nam was essential, and a long-term promotional campaign would be implemented to foster wide environmental awareness.

327 Forestry Programme

Decision No 327/CT of September 1992 declared policies on barren lands, denuded hills, forests, alluvial coastal grounds and waters:

- Forests in areas where ethnic minorities practice shifting cultivation to be protected.
- State lands and financial resources to provide for rural people to encourage them to protect and manage forest lands for state use.
- Barren lands and hills to be reforested with indigenous species and cash crops for long-term protection.

Biodiversity Action Plan

A Biodiversity Action Plan (BAP) for Viet Nam was adopted as policy on 22 December 1995, whose long-term objective was to protect biodiversity within a framework of sustainable development. The immediate objectives were:

- to protect endemic, vulnerable ecosystems faced with reduction or destruction caused by human activity.
• to protect biodiversity components subject to over-exploitation or which are ignored.

• to identify and promote the values of biodiversity for sustainable development in furtherance of Viet Nam's economic targets.

Actions identified for urgent attention were:

• **Policy and legal issues**
  
  • Additional laws needed; some existing laws to be amended. Laws on exploitation, sustainable use and trade in biodiversity products need special attention.
  
  • Law enforcement to be strengthened.
  
  • A review needed of functions and duties of organisations that manage protected areas.

• **Protected areas**
  
  • Additional protected areas to be established in areas of high biodiversity. Develop buffer zones around them. Include wetland and coastal habitats.
  
  • Develop gene banks to ensure continuation of varieties of flora, micro-organisms and domestic livestock.
  
  • Develop zoological gardens for recreational, research and educational purposes.

• **Awareness building**
  
  • Inform the public on biodiversity values and foster positive attitudes.

• **Capacity building and staff training**
  
  • Develop greater management skills; promote exchange of information; establish systems to monitor changes in biodiversity.

• **Scientific research**
  
  • Technologies used in sustainable utilisation; evaluating changes in biodiversity resources; biosafety; organisms of sea and forest that have high economic value but face extinction due to over use.
  
  • Studies of biodiversity issues in neighbouring countries

• **Socio-economic issues**
  
  • The aim is by various appropriate means to attain sustainable development.

• **International cooperation**
  
  • Strengthen

**Other policies**

Two other policy plans relating to biodiversity were adopted: a National Plan for the Environment and Sustainable Development in 1992, and a National Tropical Forest Action Plan in 1995.

In 1997, logging was suspended in 400 of Viet Nam's 500 State Forest Enterprises (SFEs). They were to continue operating as 'Public Welfare Enterprises', using centrally allocated funds to support planting and forest protection. The 100 SFEs that continued logging were chiefly in provinces of the central highlands: annual extraction is to be reduced to 300,000 m³ by 1999.
General comment

These are admirable policies but there is little evidence to suggest that population growth will be reduced to zero in the near future, and this was a fundamental prerequisite stressed in the 1985 NCS. Nor has the current study discovered any grounds for supposing that deforestation has yet been halted.

3. BIODIVERSITY LEGISLATION

3.1 State law

Biodiversity conservation is provided for in the Law on Environmental Protection dated 27 December 1993. Earlier statutory laws that relate to biodiversity include:

- Ban on Elephant Hunting 1960
- Regulations on Hunting of Forest Wildlife 1963
- Decree on Forest Protection (including Protection of Wildlife)

The legal basis for protected areas is Article 5 of the Law on the Protection of Forests, promulgated on 5 September 1972. It provides for three classes of forest.

- Special use forests
- Protection forests
- Production forests

Special use forests include the protected area system of parks and reserves described below.

Protection forests comprise coastal protection areas and watershed protection areas. Some of which appear to have been taken into the protected area system.

Production forests are made up of lands allocated to state enterprises and lands allocated to cooperatives and individuals or families. As all forest land is owned by the government allocations only confer right of use, which last for between 30 and 50 years renewable.

The Forestry Protection and Development Act of 1991 provided for special use areas to become national parks, certain areas as protected forests for watershed protection and others for hydroelectric power generation. The Act declared that revised forestry policy would aim:

- to establish a system of protection forests of about six million hectares;
- to establish two million hectares of nature reserve, containing sustained use zones for local communities;
- to establish 11 million hectares of production forest: and
- to attain nation-wide forest cover of 40 percent.

The latter is an ambitious aim. Present cover is quoted as 28 to 29 percent (some authors place it lower). To achieve 40 percent calls for reforestation over at least 36,000 km² of land—a formidable task. Grounds for optimism may be found in an apparent increase in forest from 23 percent in 1983 to present day levels. However, MacKinnon (1997) asserts that today's figure includes exotic plantations and degraded and secondary forest, and that good quality forest has continue to decline.

3.2. International conventions
Viet Nam is signatory to the following international conventions relating to biodiversity conservation.

- Convention on Biological Diversity
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat Ramsar Convention
- Convention Concerning the Protection of the World Cultural and Natural Heritage
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals

4. CATEGORIES OF PROTECTED AREAS

Viet Nam's first protected nature area (Cuc Phuong National Park) was established in 1962. There are now four categories of protected area, all of which belong to the class of Special Use Forest.

- National park
- Nature reserve
- Species/habitat reserve
- Protected landscape (includes cultural sites)

There is also a list of ‘proposed marine protected zones’, which are not included in this study. These categories are currently under review and may change in the near future. National parks appear to be regarded as tourism (or potential tourism areas) that will be developed according. Nature reserves and species/habitat reserves are biodiversity conservation areas, with little or no distinction in the ways they are managed. The Forest Protection and Development Act of 1991 provides for zoning in nature reserves to allow sustainable use of resources by local people. Protected landscapes are declared and managed for their scenic and aesthetic qualities and, in some cases to safeguard cultural and historical sites.

There are also large tracts of protection forest managed by FPD, smaller ones by provincial forest offices. Inventories or maps were not available.

5. INSTITUTIONAL ARRANGEMENTS

5.1 State management

Two central government ministries are involved in biodiversity and protected area management:

- Ministry of Science, Technology & Environment (MOSTE)
- Ministry of Agriculture & Rural Development (MARD)

Within MOSTE is the National Environment Agency (NEA). NEA is responsible for implementing the Biodiversity Action Plan, assisted by GEF, WWF & IUCN. NEA also coordinates environmentally related activities of all ministries and provincial governments. There are 64 provinces, of which IUCN considers 30 to be rich in biodiversity.

The controlling body in each province is the Provincial Peoples Committee (PPC). Central government departments are represented in provinces by departments of the same name. Budgets are provided by central government but PPCs decide how they will be spent. Protected areas are managed in a manner that involves
both MARD and the PPCs. Within MARD, the Forest Protection Department (FPD) is directly responsible for national parks. With a few exceptions, other categories of protected area are managed by provincial forest protection offices, which are accountable to the PPCs, although FPD provides an advisory service. The exceptions are a few nature reserves that receive large external funding and have been taken back under central government control.

Protection forests are mostly watched over by district forest protection offices although the FPD oversees larger protection forests.

The staff of FPD numbers 40: 30 ‘Engineers’ (foresters, biologists and lawyers) and 10 ancillary workers. Provincial and district forest protection offices employ about 7,500 men and women: 1,700 professionals, 3,700 technicians and 2,100 ancillary workers. Of these 7,500, about 3,500 (47 percent) are engaged upon protected area management.

Also within MARD is the Forest Inventory and Planning Institute (FIPI), whose chief function is to make and maintain forest inventories and prepare maps. FIPI also prepares operations and development plans for protected areas that are submitted to central government for approval and allocation of budgets. They are not management plans as the term is normally understood (i.e., that describe the resource base, set objectives and targets and prescribe strategies for management and development).

A management-planning workshop, organised by Fauna and Flora International (FFI) in 1998, focused on Cuc Phuong National Park and produced and submitted a draft model management plan to FIPI for evaluation. The outcome was still undecided at the time of the current study.

The manpower resources outlined above are considerable. Constraints on effective management of biodiversity appear to be due to problems of poor coordination between the central FPD and the provincial forest offices. There is also a question of priorities: in national parks, tourism development is accorded greater priority than biodiversity values, even though the latter may be high. Tourism is not encouraged in nature reserves, which are supposed to be managed specifically for biodiversity; but if a nature reserve is seen to have tourism potential it is likely to be reclassified a national park (e.g., Phong Nha Nature Reserve appears set to be redesignated).

Two other ministries may play roles in protected management. The Ministry of Fisheries (MOF) deals with fish resources and fishing but in recent years it is has been called upon to take a greater interest in marine and wetlands biodiversity. As a consequence there is some uncertainty as to who should be responsible for protected marine areas. The Ministry of Culture also has an interest in maintaining the integrity of cultural or historical sites where they occur in protected landscapes.

The total budget provided for protected areas is currently about VND25 billion (US$1.89 million), divided between the categories as follows:

- **National parks**: VND13 billion (US$0.96 million)
- **Nature reserves + species/habitat reserves**: VND7 billion (US$0.52 million)
- **Protected landscapes**: VND5 billion (US$0.37 million)

Revenue earned from protected areas, chiefly through tourism, is subject to a 14 percent government tax. Of the remaining 86 percent, 35 percent is paid to the central government treasury, and 51 percent ploughed back into protected area management.

### 5.2 NGO and donor involvement

Support in managing biodiversity and protected areas has been provided by:

- Netherlands, the major donor;
- Denmark;
- Finland;
- Sweden, chiefly forest development but recently moving into community development;
• UNDP/GEF, developing the BAP;
• World Bank/GEF, marine areas;
• World Bank, on protected areas in southern Viet Nam and buffer zones; and
• the EU, a major buffer zone around Pu Mat Nature Reserve.

NGOs presently assisting biodiversity and protected area management are WWF, FFI, BirdLife International (BLI), Frankfurt Zoological Society (FZS) in Coc Phuag National Park, and the Australian Research Environment Agency (AREA). IUCN is a prominent international agency also assisting in this work.

WWF and CARE and are working on a programme in southern Viet Nam to develop and foster the interest of local rural inhabitants.

BLI, supported by the EU, has been engaged on a long running programme of identifying the most promising sites for adding to the protected area system.

FFI has several projects.

• In Tak Ke Ban Bung Species/Habitat Reserve, work on snub-nosed monkey (Pygathrix avunculus), which is endemic to Viet Nam and of which only about 200 remain in the wild. The project seeks to train Forest Guards, conduct monkey surveys and make socio-economic studies of people who live in and outside the reserve.

• In Cuc Phouey National Park, a project running since 1995. It studies socio-economic conditions of people living in buffer zones in relation to their uses of natural resources and make biodiversity surveys, especially of bats, amphibia, butterflies and lianas. It has developed a captive breeding programme for Owston's palm civet (a monospecific) genus, and (since 1996) carried out an environmental education programme aimed at primary schools around the national park.

• In Pu Mat Nature Reserve, funded by the EU, a six-year programme of biodiversity survey.

• In Phong Nha-Ke Bang Nature Reserve (due to become a national park), biodiversity surveys and training Forest Guards in mammal survey techniques.

• A long-running elephant survey throughout the country.

5.3 Private sector involvement

The private sector is not involved in biodiversity or protected area management. Two tourism companies are active in some national parks but not in a management capacity.

6. INVENTORY OF PROTECTED AREAS

The protected area system is in a state of flux, and may alter before the end of the century. The following lists were up-to-date as of November 1998.

**National parks** (IUCN management category II)

<table>
<thead>
<tr>
<th>National Park</th>
<th>Size (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bach Ma</td>
<td>220</td>
</tr>
<tr>
<td>2. Ba Be</td>
<td>233</td>
</tr>
<tr>
<td>3. Ba Vi</td>
<td>74</td>
</tr>
<tr>
<td>4. Ben En</td>
<td>166</td>
</tr>
</tbody>
</table>
5. Cat Ba 152
6. Con Dao 150
7. Cuc Phuong 222
8. Nam Cat Tien 379
9. Tam Dao 369
10. Yok Don 582

| Total national parks | 2,547 km² |

**Nature reserves** (IUCN management category 1a)

<table>
<thead>
<tr>
<th>Nature reserve</th>
<th>Size (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ban Dao Son Tra</td>
<td>44</td>
</tr>
<tr>
<td>2. Binh Chau-Phuoc Buu</td>
<td>113</td>
</tr>
<tr>
<td>3. Ba Na-Nui Chua</td>
<td>432</td>
</tr>
<tr>
<td>4. Bac Me</td>
<td>150</td>
</tr>
<tr>
<td>5. Ba Mun</td>
<td>20</td>
</tr>
<tr>
<td>6. Bu Gia Map</td>
<td>223</td>
</tr>
<tr>
<td>7. Bien Lac-Nui Ong</td>
<td>354</td>
</tr>
<tr>
<td>8. Chu Hoa</td>
<td>174</td>
</tr>
<tr>
<td>9. Chu Mom Ray</td>
<td>322</td>
</tr>
<tr>
<td>10. Chu Yang Sin</td>
<td>323</td>
</tr>
<tr>
<td>11. Cu Lao Cham</td>
<td>15</td>
</tr>
<tr>
<td>12. Du Gia</td>
<td>200</td>
</tr>
<tr>
<td>13. Easo</td>
<td>220</td>
</tr>
<tr>
<td>14. Huu Lien</td>
<td>106</td>
</tr>
<tr>
<td>15. Ho Ke Go</td>
<td>220</td>
</tr>
<tr>
<td>16. Hang Kia-Pa Co</td>
<td>71</td>
</tr>
<tr>
<td>17. Hang Phuong Hoang</td>
<td>50</td>
</tr>
<tr>
<td>18. Hoang Lien Son</td>
<td>298</td>
</tr>
<tr>
<td>19. Khe Ro</td>
<td>57</td>
</tr>
<tr>
<td>20. Kim Hy</td>
<td>136</td>
</tr>
<tr>
<td>22. Kon Ka Kinh</td>
<td>280</td>
</tr>
<tr>
<td>23. Krong Trai</td>
<td>223</td>
</tr>
<tr>
<td>24. Ky Throng</td>
<td>176</td>
</tr>
<tr>
<td>25. Mo Re-Bac Son</td>
<td>40</td>
</tr>
<tr>
<td>26. Nam Ka</td>
<td>246</td>
</tr>
<tr>
<td>27. Nam Nung</td>
<td>65</td>
</tr>
<tr>
<td>28. Ngoc Linh</td>
<td>500</td>
</tr>
<tr>
<td>29. Nui Ba-Bi Doup</td>
<td>739</td>
</tr>
<tr>
<td>30. Nui Giang Man</td>
<td>600</td>
</tr>
<tr>
<td>31. Phu Quoc</td>
<td>144</td>
</tr>
<tr>
<td>32. Phong Nha-Ke Bang</td>
<td>1,167</td>
</tr>
</tbody>
</table>
33. Phong Quang  
34. Phu Canh  
35. Pu Hoat  
36. Pu Hu  
37. Pu Huong  
38. Pu Mat  
39. Pia Oac  
40. Pu Luong  
41. Song Thanh - Dac Pong  
42. Sop Cop  
43. Tay Con Linh  
44. Ta Dung  
45. Ta Kou  
46. Ta Sua  
47. Tuong Tien  
48. Vu Quang  
49. Vuc Mau  
50. Xuan Nha  
51. Xuan Son  
52. Yen Tu  

Total nature reserves 13,935

Species/habitat reserves (IUCN management category IV)

<table>
<thead>
<tr>
<th>Size (km²)</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cac San Chim</td>
<td>5</td>
</tr>
<tr>
<td>2. Cat Loc</td>
<td>306</td>
</tr>
<tr>
<td>3. Dat Mui Nam Can</td>
<td>45</td>
</tr>
<tr>
<td>4. Dinh Quan</td>
<td>140</td>
</tr>
<tr>
<td>5. Earal</td>
<td>0.5</td>
</tr>
<tr>
<td>6. Lung Ngoc Hoang</td>
<td>60</td>
</tr>
<tr>
<td>7. Muong Nhe</td>
<td>3,103</td>
</tr>
<tr>
<td>8. Phong Dien</td>
<td>250</td>
</tr>
<tr>
<td>9. Rung Kho Phan Rang</td>
<td>168</td>
</tr>
<tr>
<td>10. Tak Ke-Ban Bung</td>
<td>419</td>
</tr>
<tr>
<td>11. Tam Quy</td>
<td>4</td>
</tr>
<tr>
<td>12. Thai Thuy</td>
<td>131</td>
</tr>
<tr>
<td>13. Tien Hai</td>
<td>125</td>
</tr>
<tr>
<td>14. Tram Chim Tam Nong</td>
<td>75</td>
</tr>
<tr>
<td>15. Trap Ksor</td>
<td>1</td>
</tr>
<tr>
<td>16. U Minh Thuong</td>
<td>85</td>
</tr>
<tr>
<td>17. Vo Doi U Minh</td>
<td>34</td>
</tr>
<tr>
<td>18. Xuan Thuy</td>
<td>77</td>
</tr>
</tbody>
</table>
7. CONSERVATION COVERAGE BY PROTECTED AREAS

The protected area system covers 6.8 percent of the country. National parks, nature reserves and species/habitat reserves make up 95 percent of the total system.

<table>
<thead>
<tr>
<th>Category</th>
<th>Area (km$^2$)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>National parks</td>
<td>2,547</td>
<td>0.8%</td>
</tr>
<tr>
<td>Nature reserves</td>
<td>13,935</td>
<td>4.2%</td>
</tr>
<tr>
<td>Species/habitat reserves</td>
<td>5,029</td>
<td>1.5%</td>
</tr>
<tr>
<td>Protected landscapes</td>
<td>1,179</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22,690</strong></td>
<td><strong>6.8%</strong></td>
</tr>
</tbody>
</table>

BAP (p111) stated that ‘The Ministry of Forestry has agreed to extend the area of nature reserves and national parks to well over 2 million ha by the year 2000.’ The total area of these two categories plus species/habitat reserves in 1998 was slightly above target.
To a greater extent than any other GMS country, Viet Nam's protected areas are islands in a sea of humanity. Individually they are relatively small. More than half are less than 200 km$^2$; only three exceed 1,000 km$^2$. The largest, Muong Nhe Species/Habitat Reserve, in the extreme north-west of Viet Nam, is believed to have lost all its elephants and become little more than a tract of degraded grassland. Based upon theories of island biogeography, species loss is likely to occur at a faster rate here than in neighbouring countries.

A government programme is under way that aims to double the size of the protected area system. In support of this initiative, a review of the existing system, funded by the EU and undertaken by BLI, is identifying the most promising sites. Rosenthal (1998) records that the programme has encountered complications arising from weak inter-institutional relations. MARD approved the project knowing that it could not be completed before 1999, but FPD went ahead to develop its own list of priority areas and is now seeking approval before BLI has completed its study. The FPD and BLI lists may be compiled using different criteria, and the former likely to be developed in a less rigorous and scientific manner.

The original protected areas system was designed almost exclusively to protect upland forest, and largely ignored marine, coastal, wetland and lowland forest environments. While attention has since been paid to the sea, coasts and wetlands, lowland forest, which has high biodiversity values in respect of bird life in particular, is still inadequately represented.

While representative coverage of habitats (apart from lowland forest) is good, species of special interest are no so well catered for. This applies especially to large mammals, for which the existing protected areas are too small. Nor does the present system adequately protect pheasant populations. Viet Nam is rich in pheasants, three being endemic (Edward's, Imperial and Vo Quy).

Studies are needed to establish the distributions and abundance of special interest species so that proposals for amending the protected area system can be prepared.

### 8. AREAS OF MAJOR BIODIVERSITY SIGNIFICANCE

BAP identified 25 biodiversity 'hot spots'. The four areas described below are noted for richness of biodiversity. All are in areas of upland forest.

**Central Laotian border**

Four protected areas lie in upland forest along this stretch of the border with Lao PDR. From north to south they are:

- Pu Mat Nature Reserve in Nghe An Province
- Vu Quang Nature Reserve in Ha Tinh Province
- Nui Giang Man Nature Reserve in Quang Binh Province
- Phong Nha-Ke Bang Nature Reserve in Quang Binh Province

The scientific discovery of saola (*Pseudoryx nghetinhensis*) was made in this area. It is found in at least the first two listed reserves but is nocturnal and evasive in nature and may be more widespread. It also occurs outside the protected areas, and across the international boundary in Lao PDR. Three other large mammals occur and are threatened: giant muntjac, a small muntjac and Troungsen muntjac.

The last named reserve is a biosphere reserve under UNESCO's Man and the Biosphere Programme.

**Southern Laotian border**

One protected area, Song Tan-Dac Pring Nature Reserve in Quang Nam Province.

**Northern Cambodian border**
Four protected areas lie in reasonably well-forested land along this stretch of the border with Cambodia. From north to south they are:

- Chut Mom Ray Nature Reserve in Kon Tum Province.
- Yok Don National Park in Dak Lak Province
- Bu Gia Map Nature Reserve in Binh Phuoc Province.

Besides its rich biodiversity, several large mammals survive here including elephant, wild buffalo, ox and saola.

This area forms part of a larger area that extends across the international boundaries into Lao PDR and Cambodia—the Kong-San-Srepok watershed. This watershed has some of the finest (some say the finest) forest covers in the Mekong basin; and it contributes 20 percent of the Mekong River's volume below the confluence. Wild cattle, Asian elephant and tiger are known to occur; and protected areas have been declared in all three countries.

Cat Loc Species/Habitat Reserve

This reserve contains the last surviving subspecies of Javan rhinoceros left on the Asian mainland. Their numbers are variously estimated to be from five to 10.

9. TOURISM IN PROTECTED AREAS

National parks are being developed for tourism, and other categories of protected area that have tourism potential may be reclassified as national parks. This results in the parks being perceived as bases for the tourism industry rather than biodiversity conservation areas.

The most visited area is Cuc Phuong National Park. Annual numbers of visitors are disputed. One source (FPD) estimated about 70,000 including 10 percent foreigners. A second source (FFI) cited 30,000 visitors including about 1,000 foreigners.

10. COMMUNITY PARTICIPATION

All protected areas are used by people living around them, and some have settlements within. The emphasis has, for many decades, been on law-enforcement and exclusion. The problem is exacerbated with increasing human population densities.

Participatory management involving people who live in or nearby protected areas is a fairly recent concept in Viet Nam and elsewhere in the region. There is little capacity within government to handle this approach. Much of the current work to develop participatory management in led by NGOs, who report difficulties in getting programmes started due to government officials':

- lack of understanding;
- inexperience or unwillingness to cooperate across institutional boundaries; and
- reluctance to work with communities

One study into methods of promoting community participation is described in Anon (1998b). It was developed over a five-year period with seven villages bordering Ho Ke Go Nature Reserve. This initiative assisted the local inhabitants to establish alternative subsistence and income-generating systems, starting with rice and moving on to bee-keeping and fruit tree cultivation; later a small-scale hydroelectric generator was set up in a stream nearby. This is reported to have taken pressure off the protected area, and given people a heightened appreciation of the connection between the forest and their well-being: trees producing flowers for honey
production, and guarding the catchment to ensure a steady flow of water for power generation.

11. GENDER

According to information provided by FPD, it employs 33 men and seven women. Five are ‘engineers’ (technical positions): the consultant interviewed one. In the provincial and district forest protection offices, 773 women are employed in a workforce of about 7,500.

In communities, village leaders are invariably men, and in most other spheres leaders or representatives are male. Women, on the other hand, do much of the harvesting of forest produce other than felling timber and hunting. If women are to be involved in decision making on natural resource use they need positive encouragement.

12. CROSS BOUNDARY ISSUES

12.1. Internal boundaries

Only two protected areas straddle provincial boundaries; more lie across two or more districts. FPD report no major conflicts of interest occur but irksome complications sometimes arise: for example, difficulties in rotating staff within a protected area because this would incur moving from one province or district to another.

12.2 International borders

Twelve protected areas lie adjacent to international borders; they are listed below. Several others are not far away. Those contiguous with protected areas in neighbouring countries are marked with asterisks.

Adjoining China (Yunnan Province)

   Phong Quang Nature Reserve

Adjoining China and Lao PDR

   Muong Nhe Species/Habitat Reserve * (to a Lao protected area). (Uncertain if contiguous with protected areas in Yunnan but must be very close)

Adjoining Lao PDR

   Xuan Nha Nature Reserve
   Pu Hoat Nature Reserve
   Pu Mat Nature Reserve (contiguous with a proposed protected area)
   Vu Quang Nature Reserve *
   Nui Giang Man Nature Reserve *
   Phong Nha-Ke Bang Nature Reserve *
   Song Thanh-Dac Pring Nature Reserve

Adjoining Cambodia

   Chu Mom Ray Nature Reserve *
   Yok Don National Park *
   Bu Gia Map Nature Reserve

Collaboration with neighbouring countries is being developed as a means of finding solutions to management problems with protected areas that lie along international frontiers. UNDP and WWF support a Regional Biodiversity Forum involving Viet Nam and Lao PDR.
12.3 Cross border trade

Viet Nam is both a source of wildlife and a conduit for it from Lao PDR and Cambodia in a massive trade, much of it illegal, that flows northwards into China. This is in spite of the fact that Viet Nam is a signatory to CITES. Viet Nam is also a recipient of timber from Cambodia, contributing to its neighbour’s continuing loss of forest biodiversity.

An IUCN report (Anon. 1998b) details the trade in wildlife. Although many species traded are not presently endangered, the sheer volume of trade presents a severe threat to biodiversity in the three countries. The end uses are chiefly medicinal and culinary although some products are used for handicraft work (e.g., tiger claw pendants) or as trophies (e.g., elephant tusks or tiger skins). Some primates and most birds are traded live as pets.

Major trade routes pass across international borders from Lao PDR and Cambodia into Viet Nam. They are by others from within Viet Nam itself, and then pass by way of Ho Chi Minh City or Hanoi (or both) to China’s Yunnan and Guangxi Provinces. There are 21 official crossing points between Viet Nam and China: the main ones are Lao Cai, Dong Dang and Mon Cai. The first two have good road and rail access to Kunming as well as to other parts of China.

Reptiles and small mammals make up the bulk of the trade. Birds are exported in lesser numbers. Larger mammals include macaques, gibbons and langurs, which are less commonly traded but fetch higher prices. The rarest species such as tiger, leopard and elephant are traded in the form of by-products.

While China has an apparently insatiable desire for wild animal products, Viet Nam also has a healthy appetite. The demand in both countries for wildlife has risen with their economic growth. Traditional Vietnamese medicine and traditional Chinese medicine use similar ranges of wild animal products.

Attempts to control this flow of wildlife into China have been tried but to little apparent effect. A 1995 meeting between China’s Ministry of Forestry and Viet Nam's MARD resolved to ‘enhance their co-operation’ in adopting active and effective approaches to prevent and crackdown on illegal wildlife trading along the border (Anon. 1998b). There is no evidence of further movement.

13. MAJOR PROBLEMS AND ISSUES

Deforestation

Deforestation is the over-riding threat to biodiversity conservation in Viet Nam. It is a result of several human activities outlined below. The impacts of these activities not only reduce forest cover but break up remaining areas into patches of ever-decreasing size that are increasingly less able to retain larger species, species of low density or that have wide range requirements.

Human population pressure

Viet Nam has the highest population density in the GMS. The imperative to bring population growth to zero was stressed in NCS but there are no signs that this can be achieved until the middle of the 21st century (Mackinnon, 1997). Given high population density and continued growth, the biggest conservation challenge is to stabilise use of natural resources in the face of heavy and increasing reliance upon them. There is no obvious solution to this problem, and it seems unlikely to go away.

Encroachment

Protected areas are subject to pressure from local people moving into upland forests in response to population increase and the need for land. Given an insufficiency of arable land on forested land beside protected areas, peoples are driven by necessity into these areas to seek resources needed to sustain them. Most ethnic minorities live in or near by protected areas and government, sensitive to their rights, is loath to consider resettlement as a solution.

Unsustainable use of forest resources
Non-timber forest products, plant and animal, are harvested by those who live in or near protected areas as a means of subsistence. Forests resources are perceived as belonging to no one and available to all. Harvest levels are unsustainable, and biodiversity suffers. Spokesmen of conservation NGOs proposed several means of dealing with this problem. They included:

- investing heavily in developing buffer zones to take pressure off protected areas;
- developing forestry management programmes, especially extension programmes in agroforestry and reforestation;
- alleviating poverty through credit schemes to enable farmers to improve their methods of land management through;
- developing public environmental appreciation through education at schools and adult levels; and
- developing extension services in agricultural techniques for people who lack prior experience.

Logging

Some timber is being removed illegally for commercial sale, depleting the standing stock of forest further.

Unawareness

There is little public appreciation for the values of biodiversity and the reasons for maintaining ecological processes intact or of the roles that protected areas play. Apart from being sources of essential products for those who live nearby to gather according to need, they do not fulfil any obvious public needs. Biodiversity and protected areas lack a constituency.

An inadequate protected area system

Individual protected areas tend to be small, and surrounding human populations relatively dense. Ideally, the system needs to be enlarged, and strategic habitat corridors developed between selected parks and reserves. Yet the chances of increasing the size of the system (government’s declared intention) in the face of increasing pressure for land and forest resources seems remarkably optimistic.

Inadequate management resources

More intensive management is needed if biodiversity loss from protected areas is to be minimised or slowed down. Manpower (40 persons only) in the central government FPD is insufficient to oversee the management of protected areas nation-wide. Although much greater numbers are employed in the provincial forest offices, coordination between them and the central department is weak. Management of protected might benefit if control of all protected areas were to be centralised and placed under a single, national authority.

Unsystematic management

There is no systematic approach to management, nor is there an overall policy for protected areas. Management plans that state objectives, identify strategies and set targets are absent. There is a need to prioritise protected areas so that the resources that are available can be allocated accordingly. Some individual areas have little biodiversity value, or have lost what values they once had. Perhaps they should be abandoned and traded for other areas to expand the size of high priority protected areas.

Massive uncontrolled trade in wildlife

The flow of wild animal products northwards into China affects biodiversity not only in Viet Nam but also in Lao PDR and Cambodia. Viet Nam is a signatory to CITES and is failing abysmally to discharge its responsibilities. Regulatory mechanisms are under funded and undeveloped. Control is minimal.