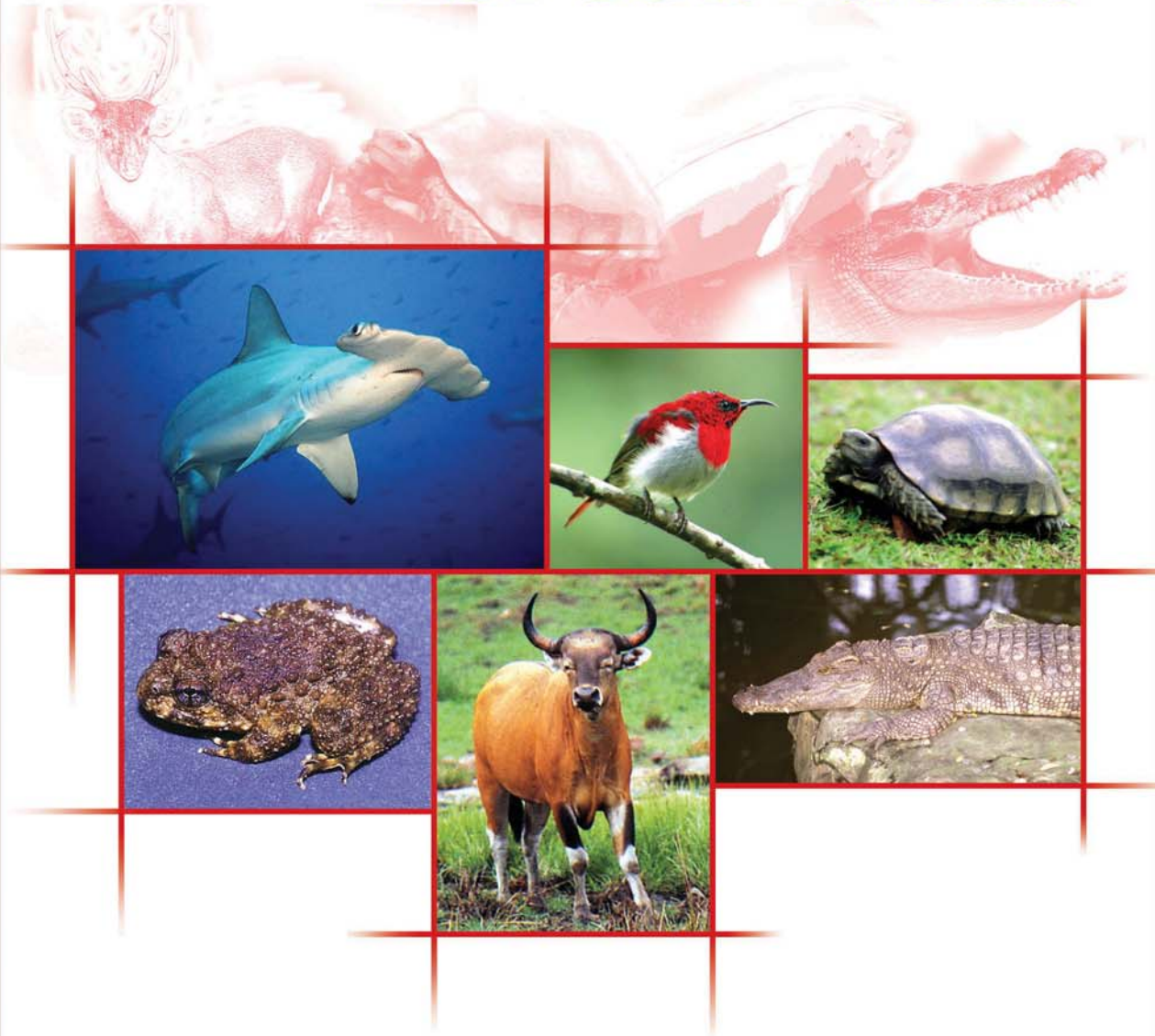


# Thailand Red Data :

# Vertebrates



Office of Natural Resources and  
Environmental Policy and Planning



United Nations Development  
Programme

## *Thailand Red Data :* **VERTEBRATES**

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# Foreword

As the 188<sup>th</sup> party to ratify the Convention on Biological Diversity (CBD) on January 29<sup>th</sup> 2004, Thailand must fulfill the convention's resolutions and obligations for the duration of the program as a signatory member. Article 7(a) of the CBD states that each Contracting Party is to "identify components of biological diversity important for its conservation and sustainable use" while considering endangered, rare, endemic, or threatened species. Furthermore, Article 8(k) specifies that each Contracting Party is to also "develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations".

In 1996, the Office of Natural Resources and Environmental Policy and Planning (ONEP) organized a meeting in order to assess the status of the biological resources in Thailand, including the status of mammals, birds, reptiles, amphibians, and fish, using the IUCN Red List Categories as a guiding document. The initial IUCN List, which provided a set of criteria to evaluate the extinction risk of thousands of species and subspecies, was created with the 2.3 : IUCN (1994) version numbering system. It later received

improvements and changes in identification criteria and was upgraded to the 3.1 : IUCN (2001) version. In 2004, the IUCN released a Red List of Threatened Species, the world's most comprehensive inventory of the global conservation status of plant and animal species.

The Office of Natural Resources and Environmental Policy and Planning, as the National Focal Point to the CBD, found it necessary to make improvements to the inventory and status assessment of threatened species in Thailand. Thus in October 2004, the Thailand Red Data : Vertebrates list and project was initiated and underwent a series of data collection, analyses, and meetings amongst involved experts.

ONEP sincerely hopes that this manual will be helpful in the identification of vertebrates in Thailand as well as provide basic information for research use in development projects, and related policy creation that would all lead to sustainable biological management.

ONEP would also like to thank all the experts and academics involved who have helped in the creation of this Red List from beginning to end. Lastly, ONEP would like to pay gratitude to the United Nations Development Programme (UNDP) for their financial support.

Office of Natural Resources and  
Environmental Policy and Planning

# Contents

Introduction .....	5
Vertebrate status in Thailand .....	8
Extinction .....	18
Zoogeography .....	27
Threat to species .....	42
Socio-economics versus Threat.....	55
The Conservation and Protection of Thai Species.....	59
Conclusion .....	72
Reference .....	76
Annexs .....	81

# Introduction



**Figure 1** The white-shouldered ibis (*Pseudibis davisoni*) is classified as extinct in the wild (EW). Nowadays, only five or six individuals can be found within a flock, often seen feeding by rivers or ponds surrounded by forests. They're distributed in south western China, Indo-china, Malaysia, Indonesia, and Thailand. In Thailand, they can be found in Chiang Rai province, the Central Plains, Surat Thani province, Trang province, and Phuket province. The white-shouldered ibis is already extinct from the wild in Thailand due to their large size which made them easy hunting targets and their low adaptability to environmental changes, all exacerbated by habitat destruction (Thailand Institute of Scientific and Technological Research, 1990). (Photo: Dome Pratumtong)



In the past, many wildlife experts and institutes tried to clarify the wildlife status in Thailand according to different criteria. For instance, Round (1988) had set up the bird status from his survey into 3 categories: Extinct-Ex, Endangered-E, and Threatened-T. Two years later, Humphrey and Bain (1990) had followed Round and tried to collect all wildlife information from various resources and proposed 6 categories: Extinct-Ex, Possibly extinct-PEx, Extirpated from Thailand-ExT, Probably extirpated from Thailand-PExT, Endangered-E, and Threatened-T. The World Conservation Union (IUCN), who has the highest response to the natural resource conservation in the world, has also conducted and revised the world wildlife status for more than 30 years. The most useful world wildlife status classification was proposed by IUCN in 1990 and 1994 in which 6 levels were set up as Extinct-Ex, Endangered-E, Vulnerable-V, Rare-R, Indeterminate-I, and Insufficient knowledge-K (Duengkae, 1998 A).

During 1987 to 1992, the United Nations Environment Programme (UNEP) had proposed the Convention on Biological Diversity, CBD. In 1990 according to the CBD, the National Biodiversity Unit, Ministry of Science, Technology and Environment of Thailand took on the responsible to study, collect, and make the country report on Biodiversity. Wildlife status in Thailand was clarified by the National Biodiversity Unit in 1992 in which 4 categories were used; Extinct-Ex, Endangered-E, Vulnerable-V, and Rare-R (National Biodiversity Unit, 1992). In 1993, the Thailand Institute of Scientific and Technological Research had compiled the list of Endangered wildlife species in which 93 species were named including, clouded leopard (*Neofelis nebulosa*), serow (*Capricornis sumatraensis*), Gurney's pitta (*Pitta gurneyi*) and Deignan's babbler (*Stachyris rodolpheii*) etc. (Duengkae, 1998 A).

The government of Thailand declared the Wild Animals Reservation and Protection Act in 1992, which was later revised in 2003. All animals in Thailand were classified into 3 categories: (1) Reserved animals, which included 12 species of mammals and 3 species of birds. These are species with a small population and some species already extinct from Thailand such as the lesser one-horned rhinoceros (*Rhinoceros sondaicus*), sumatran rhinoceros (*Dicerorhinus sumatrensis*), kouprey (*Bos sauveli*), wild water buffalo (*Bubalus bubalis*), Eld's deer (*Cervus eldii*), Schomburgk's deer (*Cervus schomburgki*), serow (*Capricornis sumatraensis*), Chinese goral (*Naemorhedus caudatus*), marbled cat (*Pardofelis marmorata*), Asian tapir (*Tapirus indicus*), Fea's muntjac (*Muntiacus feae*), dugong (*Dugong dugon*), Gurney's pitta (*Pitta gurneyi*), sarus crane (*Grus antigone*), and white-eyed river-martin (*Pseudochelidon sirintarae*); (2) Protected animals, where all the species are protected according to the law under the Ministry of Agriculture and Cooperatives, such as tiger (*Panthera tigris*), gaur (*Bos gaurus*), Siamese fireback (*Lophura diardi*), king cobra (*Ophiophagus hannah*), Indo-chinese water dragon (*Physignathus cocincinus*), giant asiatic toad (*Bufo asper*) and Blyth's frog (*Limnonectes blythii*); and (3) non-protected animals; where all species not declared in the first two categories, with a large population and/or are favorite animals in the pet market such as common wild boar (*Sus scrofa*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), many-lined sun skink (*Mabuya multifasciata*), grass frog (*Fejervarya limnocharis*) and black-spined toad (*Bufo melanostictus*) (Duengkae, 1998 A). In addition, Khobkhet (1993) had collected all bird information in Thailand and divided up the bird status into 3 categories as Extinct-Ex, Probably Extinct-PEx, and Endangered-E.

In 1996, the IUCN had revised the world wildlife status into 7 categories: 1) Extinct-EX, 2) Extinct in the wild-EW, 3) Critically Endangered-CR, 4) Endangered-EN, 5) Vulnerable-VU, 6) Lower Risk-LR, and 7) Data Deficient-DD. The Office of Natural Resources and Environmental Policy and Planning (ONEP) had made the wildlife conference in the same year for creating the wildlife status in Thailand, especially the vertebrates, according to IUCN (1996) criteria. The results showed that 6 wildlife species were already Extinct from Thailand including 1 mammal species, Schomburgk's deer (*Cervus schomburgki*), 2 species of birds, giant ibis (*Pseudibis gigantea*) and large grass-warbler (*Graminicola bengalensis*), 3 species of fishes, Siamese schilbeid catfish (*Platytrapius siamensis*), bala shark (*Balantiocheilos cf. melanopterus*) and Finescale tigerfish (*Coilus microlepis*). In addition, 3 mammal species, lesser one-horned rhinoceros (*Rhinoceros sondaicus*), Eld's deer (*Cervus eldii*), and kouprey (*Bos sauveli*), 3 bird species, milky stork (*Mycteria cinerea*), white-shouldered ibis (*Pseudibis davisoni*), and sarus crane (*Grus antigone*), and 1 reptile species, false gavia (*Tomistoma schlegelii*), were classified as in extinct in the wild. Recently, a lot of wildlife species have been clarified as endangered and threatened (Office of Environmental Policy and Planning, 1997 B).

Presently, Thailand has already become party to the CBD as the 188<sup>th</sup> country to sign as of 29 January 2004. Due to its commitment under article 7(a), Thailand has to classify and identify all biodiversity components, especially the species of endangered, rare, endemic, and threatened status for conservation and sustainable utilization. In addition, the members have to set up or conduct all necessary commitments for protecting the threatened species and population as required in article 8(k).

In 2005, ONEP had set up a conference to define the biodiversity status of various mammals, birds, reptiles, amphibians, and fish in Thailand, using the information from IUCN Red List, in which numbering system used for criteria in status classification was updated from Version 2.3 : IUCN (1994) to Version 3.1: IUCN (2001). ONEP is the national focal point to the CBD and had worked to revise the biodiversity status of wildlife in Thailand by gathering information on the status, habitat, distribution and compiling a list of threatened species in Thailand Red Data: Vertebrates. It is used for data base management in order to revise the conservation/protection strategies for biodiversity administrative in Thailand. This project was funded by United Nations Development Programme (UNDP).






# Vertebrate status in Thailand






**Figure 1** The gingo-toothed whale (*Mesoplodon ginkgodens*) was classified as critically endangered-CR with its distribution ranging from warm temperate zones to the tropical zones in the Indo-Pacific Ocean. In Thailand, the only specimen was found in Phuket province. Its cause of threat is due to fishery activities (Adulyanukosol and Kittiwattanawong, 2004). (Photo: Phuket Marine Biological Center)



**R**ecent numbers of vertebrates in the world totaled more than 57,739 species and can be divided into the following groups:

-  Mammals 5,416 species
-  Birds 9,917 species
-  Reptiles 8,163 species
-  Amphibians 5,743 species
-  Fishes 28,500 species


In Thailand, at least 4,591 species (4,608 forms) of vertebrates have been recorded:








-  Mammals 302 species
-  Birds 982 species
-  Reptiles 350 species (366 forms)
-  Amphibians 137 species (138 forms)
-  Fishes 2,820 species

## The present status

Since the IUCN Red List threatened species status assessment in 2004, the threatened organisms have undergone changes. Further studies and observation have revealed new species. Human activities have also caused great damage to natural resources, resulting in changes and declines in organism populations.

In 2004, IUCN Red list had evaluated the status of about 38,047:

-  Extinct or Extinct in the Wild included 844 species

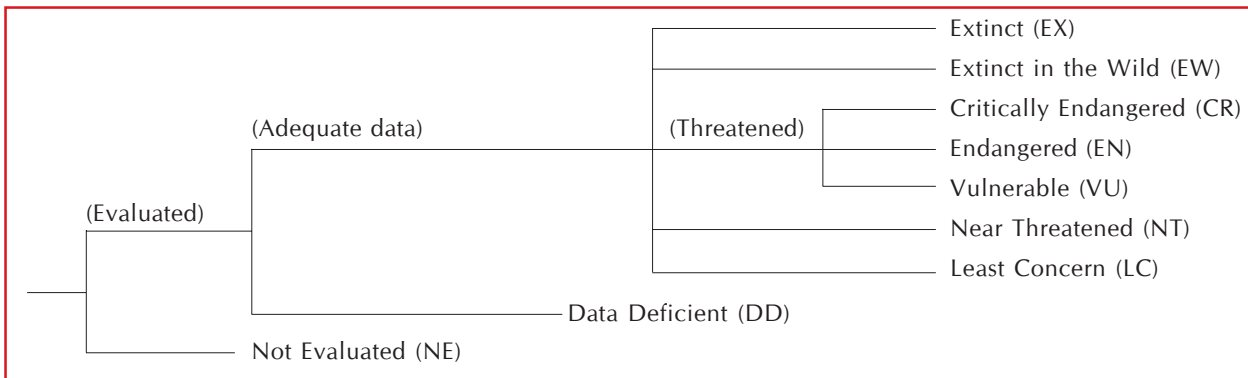
-  15,589 Threatened species including
  -  Critically Endangered species
  -  Endangered species
  -  Vulnerable species
-  3,700 Near Threatened species
-  14,334 Least Concern species
-  3,580 Data Deficient species

The status of 22,733 species of vertebrates, including mammals, birds, reptiles, amphibians and fishes were evaluated and found that 5,247 species or 23% are considered threatened (Baillie *et al.*, 2004). (Table 1)

ONEP has held meetings and discussions between experts on vertebrate species, biological scientists and other wildlife experts to improve and adjust the assessment criteria of threatened vertebrates in Thailand to the present classification criteria used. This is done with the aim in bringing attention to important species such as endemics and threatened species, as well as to focus on several domestic and global problems, and to create baseline data to be used in wildlife and biodiversity conservation. The status classification was completed using the criteria from version 3.1: IUCN (2001) which comprised of Extinct-EX, Extinct in the Wild-EW, Critically Endangered-CR, Endangered-EN, Vulnerable-VU, Near Threatened-NT, Least Concern-LC, and Data Deficient-DD (Figure 2).

**Table 1** World threatened vertebrate species.

Vertebrates	Numbers of species in the world (species)	Numbers of evaluated status species (species)	Numbers of threaten species in 2004 (species)	Percentage of threaten species per total world species (%)	Percentage of threaten species per evaluated status species (%)
Mammals	5,416	4,853	1,101	20	23
Birds	9,917	9,917	1,213	12	12
Reptiles	8,163	499	304	4	61
Amphibians	5,743	5,743	1,856	32	32
Fishes	28,500	1,721	800	3	46
Total	57,739	22,733	5,274	9	23

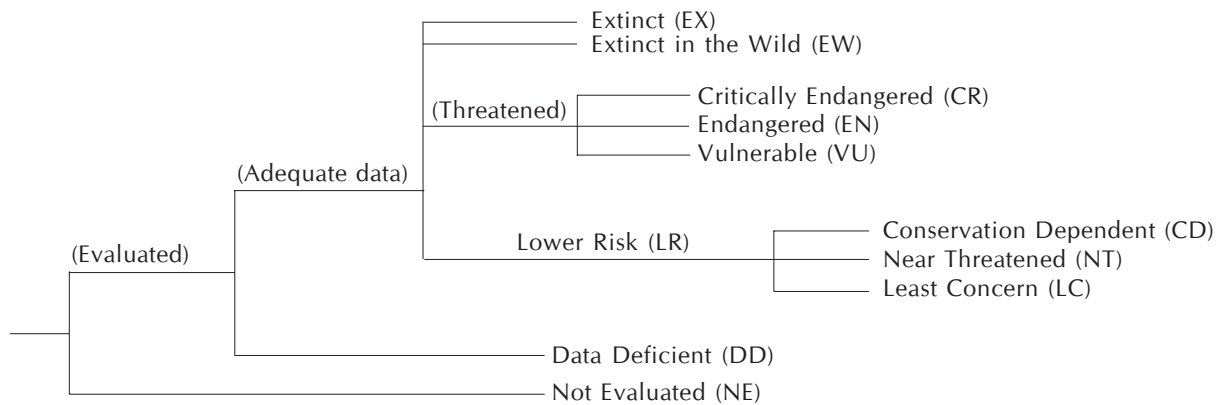


**Figure 2** The standard classification structure of version 3.1: IUCN (2001) for establishing the species list since 2003.

### Box 2.1 1996 Vertebrate Status Evaluation

The vertebrate status evaluation in 1996 used the criteria version 2.3: IUCN (1994) which consisted of Extinct-EX, Extinct in the Wild-EW, Critically Endangered-CR, Endangered-EN, Vulnerable-VU, Lower Risk-LR, Data Deficient-DD, and Not Evaluated-NE. The Low Risk-LR status is divided into 3 sub-groups: 1) Conservation Dependent-CD; 2) Near Threatened-NT; and 3) Least Concern-LC.

The structure of the evaluation criteria in 2005 which adopted IUCN's system version 3.1: IUCN (2001), was different to that of the one used in 1996 which adopted version 2.3: IUCN (1994). In 2005's version, the sub-groups of the Lower Risk-LR (Near Threatened-NT, and Least Concern-LC subgroups) status were upgraded to main status while the Lower Risk-LR status (and the remainder subgroup, Conservation Dependent-CD) was omitted altogether (compare to Figure 2).



The criteria structure of version 2.3 : IUCN (1994) in order to establish the species list during 1996-2001.

The vertebrate status assessment in 2005 was conducted by wildlife experts and representatives from both academic and private organizations. Approximately 1,196 species (1,213 forms) were evaluated, of which 548

species (549 forms) or 45% were registered as critically endangered, endangered and vulnerable. These included 116 species of mammals, 180 species of birds, 32 species (33 forms) of reptiles, 5 species of amphibians, and 215 species of fish (Table 2).

**Table 2** Registered threatened vertebrates of Thailand

Vertebrates	Species Numbers in Thailand (species)	Numbers of Registered status species (species)	Numbers of threaten species in 2005 (species)	Percentage of threaten species of species in Thailand (%)	Percentage of threaten species of registered status species (%)
Mammals	302	159	116	38	73
Birds	982	282	180	18	64
<b>Reptiles</b>	350(366)	350(366)	32(33)	9	9
Amphibians	137(138)	137(138)	5	4	4
Fishes	2,820	268	215	8	80
<b>Total</b>	<b>4,591(4,608)</b>	<b>1,196(1,213)</b>	<b>548(549)</b>	<b>12</b>	<b>45</b>

Remark : (...) indicated to form

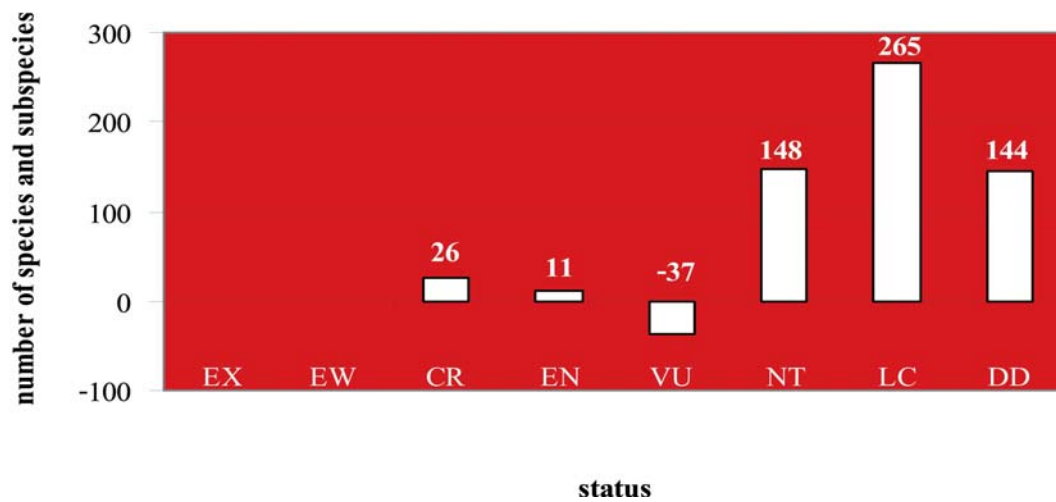
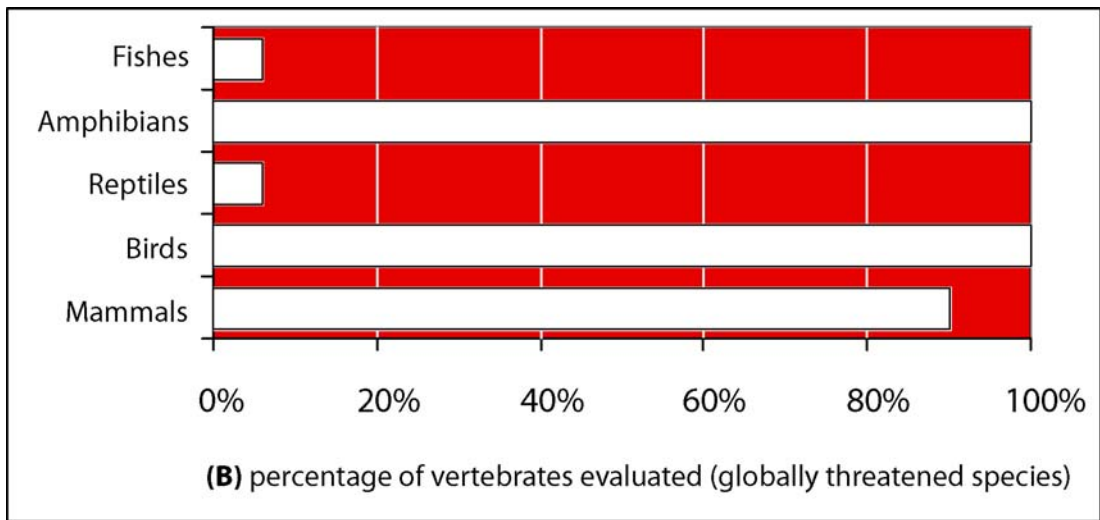
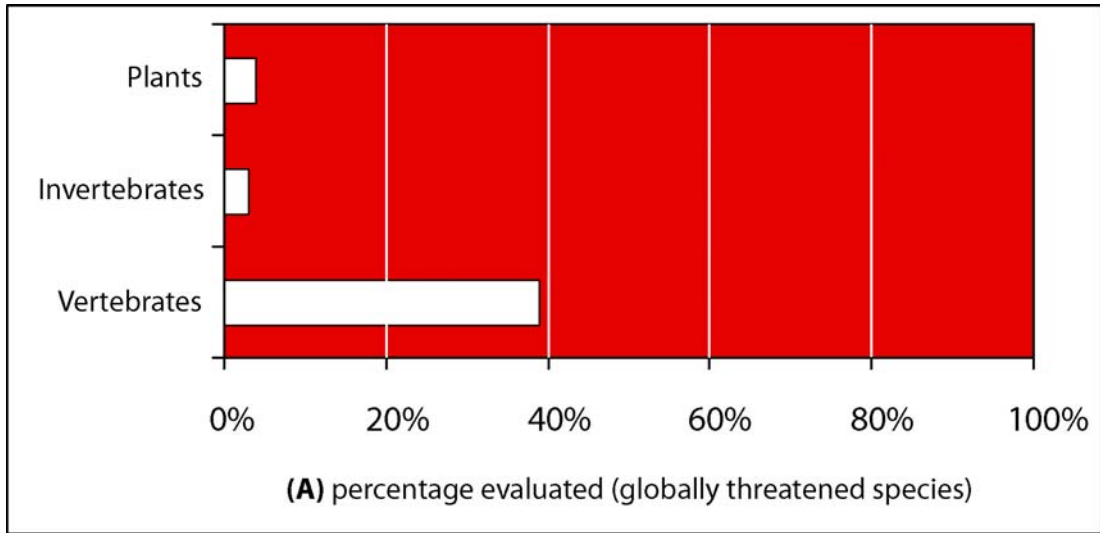
## Vertebrate Species Status

Due to increased surveys in a greater number of areas and the utilization of tools and new technologies in research, there are presently more organisms that have been assessed than in the past as new species have been discovered. Certain subspecies have also been elevated in status and are now classified as species of their own. Despite the discoveries, these new species are often found only in certain areas and in very small populations, thus usually falling under the threatened status.

About 40% of the recorded vertebrate species in the world have already been assessed, while plants and invertebrate species have not been






as readily evaluated (Figure 3 A). Birds and amphibians have been 100% completely evaluated (Figure 3 B), and mammals have been about 90% completed, while reptiles and fishes have been the least assessed when compared to the amount of species recorded at present (Baillie *et al.*, 2004).

The wildlife status classification in Thailand found that reptiles and amphibians were completely evaluated (100%), while, the mammals, birds, and fishes had evaluated only 53, 29 and 10%, respectively (Figure 3 C).



**Figure 3** The percentage of evaluated status for living species (A and B : IUCN (2004), C : ONEP (2005)  
Sources: A and B (Baillie et al., 2004)

## Box 2.2 The Number of Recorded Vertebrate Species in Thailand

-  Mammals: Prateep (1998, B) reported 294 species found in 1998; recent count totals 302 species (Nabhitabhata, 2005)
-  Birds: Lekagul and Round (1991) reported 915 species which later increased into 942 species (Khobkhet, 1998); presently at least 982 species are recorded (Sanguansombat, 2005).
-  Reptiles: Nabhitabhata *et al.* (2000) reported 325 species; 350 species (366 forms) are now recorded (Chan-ard, 2005)
-  Amphibians: Nabhitabhata *et al.* (2000) reported 132 species which later increased to 137 species (138 forms) (Chan-ard, 2005)
-  Fish: Monkolprasit *et al.* (1997) reported 1,742 species which has now increased to 2,820 species (Vidthayanon, 2005)

## Box 2.3 New findings of large mammal species within the last 20 year period (Bhumpakphan, 2005)






-  The Bornean yellow muntjac (*Muntiacus atherodes* Groves and Grubb, 1982) was discovered on Borneo Island. It was previously classified as a sub-species of *Muntiacus muntjak pleiharicus*, but later Groves and Grubb (1982) were able to clearly describe the *pleiharicus* and separated *Muntiacus atherodes* out of *Muntiacus muntjak pleiharicus* as its own species.
-  The Gongshan muntjac (*Muntiacus gongshanensis* Ma, 1990) was discovered in Gongshan County, located on the west side of Yunnan, near the China-Myanmar border.
-  The Sao La or Vu Quang Ox (*Pseudoryx nghetinhensis* Dung, Giao, Chinh, Tuoc, Arctander, MacKinnon, 1993) was discovered in 1992 by Dr. John MacKinnon who found bone and skin specimens from local people in Hatien and Ngee Ann in Vietnam. The *Pseudoryx nghetinhensis* is classified under Family Bovidae and can be found in the Annam mountainous ranges between the borders of Vietnam and Laos. Their distribution in Laos can be found in the Nam Toen watershed areas.
-  The Tainguen civet (*Viverra tainguensis* Sokolov, Rozhnov and Pham Thong Anh, 1997) was found in 1996 in the high plateaus of Tai Noeng of central Vietnam. It is classified under the same genus of *Viverra* as the large-spotted civet (*Viverra megaspila* Blyth, 1862) and the large Indian civet (*Viverra zibetha* Linnaeus, 1785) that are found in Thailand ([www.animalinfo.org/species/carnivor/vivetain.htm](http://www.animalinfo.org/species/carnivor/vivetain.htm), 2005).
-  The Giant muntjac (*Muntiacus vuquangensis* Schaller and Vrba, 1996) was first found in 1994 at Vu Quang Nature Reserve in Vietnam and can now also be found in Laos (Schaller and Vrba, 1996).
-  Annamite or Truong Son muntjac (*Muntiacus truongsoneensis* Giao, Tuoc, Dung, Wikramanayake, Amato, Arctander and Mackinnon, 1998) was discovered in the Annamite mountainous ranges, or renamed as Truong Son mountain in 1997, and was given its scientific name in 1998. The characters have a small size with black color, and both male and female have the long canines which differed from other species. In addition, this species also found in Laos.
-  Putao or leaf muntjac (*Muntiacus putaoensis* Amato, Egan and Robinowitz, 1999) was found in Putao, north Myanmar, by Dr. Alan Rabinowitz, from the WCS in 1997. Its scientific name was declared in 1999. After DNA analysis and comparison to other species - as proof that was in fact a new species - it was found to be the smallest in size in the world of the genus *Muntiacus*, with a shoulder height of only 50 cm and weight of only 11 kg.








## Threatened vertebrates in Thailand

The results of status assessments of vertebrates in Thailand showed that 548 species or 12% of the recorded species were classified as threatened species (Table 2 and 3).

Considering to the total evaluated species that are already registered in the biodiversity list status, it was found that:

-  About 73% of mammals were defined as threatened species.
-  About 64% of birds were defined as threatened species.
-  About 9% of reptiles were defined as threatened species.
-  About 4% of amphibians were defined as threatened species.
-  About 80% of fishes were defined as threatened species.

The comparison results between the numbers of threatened species in the registered list and the numbers of total recorded vertebrates in Thailand showed that:

-  About 83% of recorded mammals were defined as threatened species.
-  About 18% of recorded birds were defined as threatened species.
-  About 9% of recorded reptiles were defined as threatened species.
-  About 4% of recorded amphibians were defined as threatened species.
-  About 8% of recorded fish were defined as threatened species.

## Near threatened vertebrate species in Thailand

The evaluation results of near threatened vertebrate species in Thailand showed that 205 species (207 forms) (Table 3) could become fully threatened without the serious attention and conservation efforts. There are 15 species of mammals, 89 species of birds, 48 species of reptiles (50 forms), 33 species of amphibians, and 20 species of fishes that are classified as near threatened.

There are about 257 species (265 forms) classified under least concern of which (Table 3) 10 species are mammals, 183 species (190 forms) are reptiles, and 64 species are amphibians (65 forms).

The data deficient species are those that are lacking in information for evaluation of their risk to direct or indirect extinction. Despite basic knowledge on their population and distribution, there is still not enough relevant quantitative or distributive data to consider them as threatened, and thus further research is necessary for appropriate assessment. There 176 species (179 forms) in this category, consisting of 13 species of mammals, 9 species of birds, 89 species (92 forms) of reptiles, 35 species of amphibians, and 30 species of fish. In addition, from evaluation of the status of fish, it was found that 11 species are threatened in the wild.

**Table 3** Vertebrate status in Thailand according to ONEP (2005).

	Vertebrate status										Total
	EX	EW	Total	CR	EN	VU	Total	NT	LC	DD	
Mammals	1	4	5	12	35	69	116	15	10	13	159
Birds	2	2	4	43	66	71	180	89	-	9	282
Reptiles	-	1	1	11	5(6)	16	32(33)	48(50)*	183(190)*	89(92)*	350(366)
Amphibians	-	-		-	-	5	5	33	64(65)	35	137(138)
Fishes**	3	-	3	18	42	155	215	20	-	30	268
<b>Total</b>	6	7	13	84	148(149)	316	548(549)	205(207)	257(265)	176(179)	1,196(1,213)

Remark: EX: Extinct, EW: Extinct in the Wild, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern and DD: Data Deficient.  
(...) : form

\* indicated form and sub-species of amphibians which classified into the difference status.

\*\* 11 species was classified into the threatened *in situ*

## Extinction Trends

Assessments of the threatened status of vertebrates in Thailand (except for those under extinct and extinct in the wild) showed that 8% of mammals can be classified into the critically endangered species, 23% as endangered species, and 45% as vulnerable species (Figure 4 A). However, utilization of new techniques for observation such as automatic camera traps are helping to lower these trends as more findings of these rare species are being recorded from photographs. In addition, automatic camera traps help in determining feeding periods of the wildlife and also in distinguishing noticeable characteristics, such as size and markings of the animals, to help with their identification and population estimation.

Evaluation of bird status (except extinct and extinct in the wild) showed that 15% are classified as critically endangered, 24% as endangered, and 26% as vulnerable (Figure 4 B). Although birds are one of the most threatened groups of wildlife, their propagation in cages for conservation have been regarded

as more successful than any other group. For example, the green peafowl (*Pavo muticus*) is classified as critically endangered in nature but have been propagated and expanded in the wildlife propagation station of the Department of National Parks, Wildlife and Plant Conservation. The painted stork (*Mycteria leucocephala*) is listed as vulnerable but its propagation and re-introduction into the wild has been successful as it is able to nest and lay its eggs in Bung Boraphet, Nakorn Sawan province. Despite these success stories, there are other species of birds that are unable to propagate in cages and are at risks to extinction such as the Gurney's pitta (*Pitta gurneyi*).








The evaluation of reptiles (except extinct and extinct in the wild) show that 3% are classified as critically endangered, 2% as endangered, and 4% as vulnerable (Figure 4 C). Some studies show that certain species, such as the Siamese crocodile (*Crocodylus siamensis*) – classified as critically endangered – have been found in some conservation areas such as Khao Ang Rue Nai Wildlife Sanctuary (Faculty of Forestry, 1995), Yod Dom Wildlife Sanctuary






(Bhumpakphan *et al.*, 2003), Kang Kra Chan National Park by Bruce Kekule (Wanghongsa, 2004) and Pang Sri Da National Park, Prachin Buri province by Mr. Kitti Kreetiyutanont and Mr. Todsawan Tewakul (Bhumpakphan, 2000). However, only 1-2 individuals were recorded at each site, thus, the planning strategies should be encouraged to protect these crocodile populations before it becomes extinct in the future.

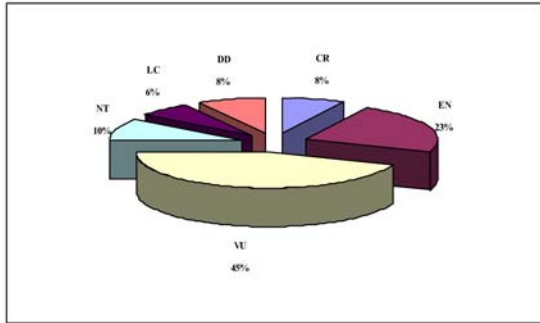
Only 4% of amphibians in Thailand have been classified as vulnerable (Figure 4 D).

The evaluation of fish (except extinct and extinct in the wild) showed that about 7% of were classified as critically endangered, 16% as endangered, and 58% as vulnerable (Figure 4 E).

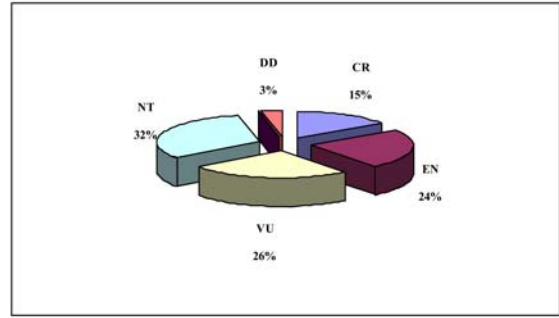
Of the total 1,183 vertebrate species (1,200 forms) evaluated, it can be summarized that (Figure 4 F):

-  About 7% were classified as critically endangered
-  About 12% were classified as endangered
-  About 27% were classified as vulnerable
-  About 17% were classified as near threatened
-  About 22% were classified as least concern
-  About 15% were classified as data deficient
-  About 46% were classified as threatened (critically endangered, endangered and vulnerable) and are likely to become extinct in the wild or from Thailand in the future including:

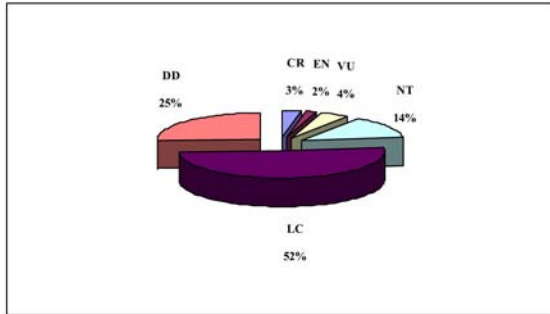
-  Mammals: flat-headed cat (*Ictailurus planiceps*), hog-nosed bat (*Craseonycteris thonglongyai*), agile gibbon (*Hylobates agilis*), banteng (*Bos javanicus*), and Irrawaddy dolphin (*Orcaella brevirostris*), etc.
-  Birds: long-billed partridge (*Rhizothera longirostris*), black hornbill (*Anthracoceros malayanus*), wrinkled hornbill (*Aceros corrugatus*), Blyth's kingfisher (*Alcedo hercules*), Chinese crested tern (*Sterna bernsteini*), white-rumped vulture (*Gyps bengalensis*), Storm's stork (*Ciconia stormi*), and Gurney's pitta (*Pitta gurneyi*), etc.
-  Reptiles: Estuarine crocodile (*Crocodylus porosus*), Siamese crocodile (*Crocodylus siamensis*), green sea turtle (*Chelonia mydas*), painted terrapin (*Callagur borneoensis*), and Burmese giant softshell (*Chitra vandijki*), etc.
-  Amphibians: Bourret's frog (*Paa bourreti*), spiny-breasted frog (*Paa fasciculispina*), large warted tree frog (*Theloderma gordonii*), and thorny warted tree frog (*Theloderma horridum*), and Taylor's warted tree frog (*Theloderma stellatum*), etc.
-  Fish: knifetooth sawfish (*Anoxypristis cuspidata*), Sompong's rasbora (*Trigonostigma somphongsi*), Kittipong's cave loach (*Schistura jaruthanini*), dwarf clown loach (*Yasuhikotakia sidhimunki*), Mekong giant catfish (*Pangasianodon gigas*), and Krabi mouth brooder betta (*Betta simplex*), etc.



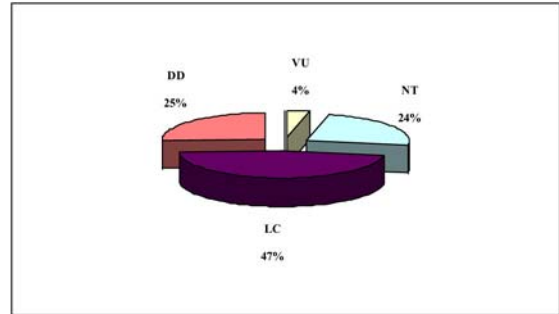
(A) Mammals (n=154 species)



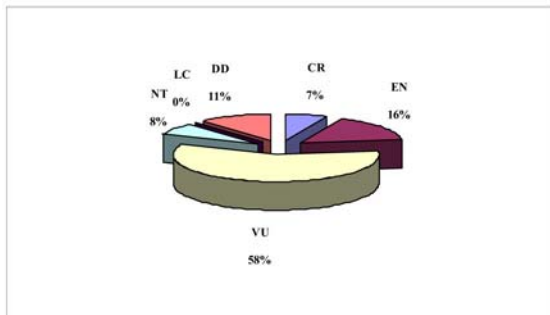
(B) Birds (n=278 species)



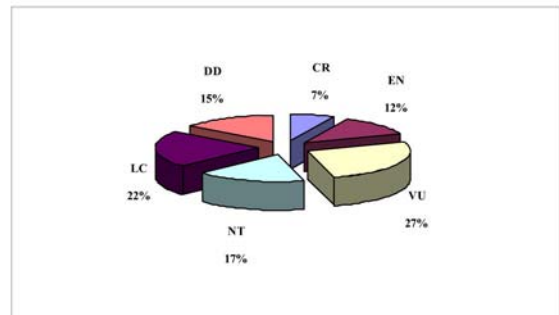
(C) Reptiles (n=349 species (365 forms))



(D) Amphibians (n=137 species (138 forms))



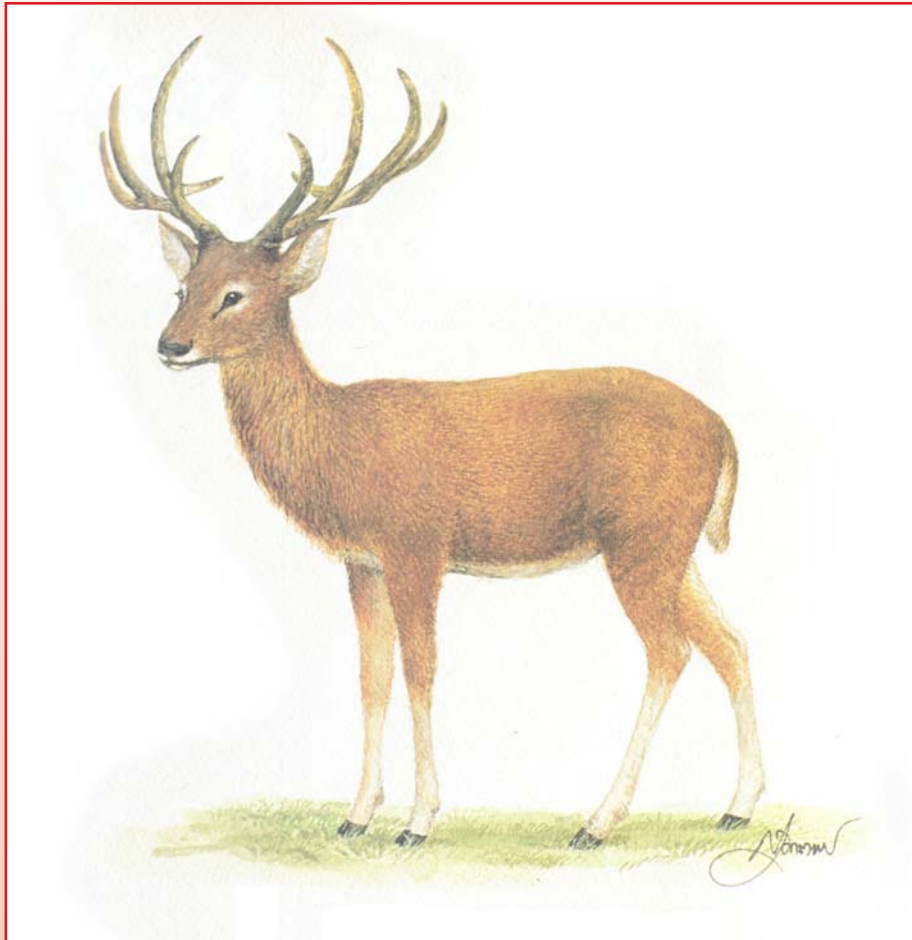
(E) Fishes (n=265 species)



(F) Total evaluated vertebrates (n=1,183 species (1,200 forms))

**Figure 4** The percentage numbers of vertebrates divided into each wildlife group (except extinct and extinct in the wild) comprise of (A) Mammals, (B) Birds, (C) Reptiles, (D) Amphibians, (E) Fishes, and (F) Total evaluated vertebrates from 5 groups.

# Extinction



**Figure 3.1** The Schomburgk's deer (*Cervus schomburgki*) is already extinct from Thailand as it was over hunted and its main habitat, open areas in central Thailand, were converted to rice paddies (Thailand Institute of Scientific and Technological Research, 1990). (Photo: Thailand Institute of Scientific and Technological Research; Wildlife Fund Thailand)



**S**pecies extinction is a natural process in evolution, evidenced by remains of fossils. However, recent extinction, especially that of wildlife, has been caused by human activities. Myers (1993) had predicted that without conservation efforts, the world biodiversity will lose about 20% of its total recent organisms in next 30 years and 50% of species in the next century. The main causes of biodiversity loss are habitat destruction, illegal hunting, pollution, invasive alien species, and climate change.

### Recent Extinction

Thailand has been one of the countries with the highest biodiversity in the world; however, the reduction of biodiversity, especially wildlife, has now become a severe problem despite conservation efforts by various organizations. Recently, a lot of wildlife species have already become extinct from Thailand such as Schomburgk's deer (*Cervus schomburgki*), giant ibis (*Pseudibis gigantea*), large grass-warbler (*Graminicola bengalensis*), Siamese schilbeid catfish (*Platytrapius siamensis*), bala shark (*Balantiocheilos cf. melanopterus*), and Siamese tiger perch (*Datnioides pulcher*) in which the first two species are already extinct from the world. While, Eld's deer (*Cervus eldii*), kouprey (*Bos sauveli*), lesser one-horned rhinoceros (*Rhinoceros sondaicus*), sumatran rhinoceros (*Dicerorhinus sumatrensis*), white-shouldered ibis (*Pseudibis davisoni*), sarus crane (*Grus antigone*), and false gavia (*Tomistoma schlegelii*), are extinct in the wild in Thailand. Although, they were defined as extinct or extinct in the wild but from the observation and monitoring in the field these species were found in the wetland areas of Buriram province. Thus, the revised status of the milky stork (*Mycteria cinerea*) was changed to critically endangered of Thailand (Sanguansombat, 2005).

#### Box 3.1 From the status of extinct in the wild to critically endangered.



The milky stork (*Mycteria cinerea*) is a large bird that can be found in Thailand, Cambodia, Vietnam, Malaysia, Sumatra and the Java Islands. This species almost always stays couples or small herds, however, during breeding season they often form large herds, especially around nesting or feeding places such as water resource areas. ONEP had listed this species as Extinct in the Wild in 1996, however, Khobkhet in 2000 found some in the southern and Bangpoo areas of Samut Prakan province. Recently, this species was found at the wetland areas of Buri Ram province and its status was revised as critically endangered (Sanguansombat, 2005). (Photo: Wachara Sanguansombat)

### Ex situ conservation and wildlife remaining

Now a day, the wildlife status evaluation is focused on the importance of wildlife in order to promote conservation strategies such as habitat protection and propagation promotion, and in turn creating supporters of wildlife protection and *ex situ* conservation, as suggested by the CBD who proposed the reservation of endangered species and returning them into their habitat under good conditions.

*Ex situ* conservation is a good way to manage endangered species and also supports *in situ* conservation. Wildlife breeding in cages is another strategy for wildlife conservation; however, it cannot be used with all wildlife species. Thus, other strategies such as artificial insemination, embryo transfer, gene banking, and animal cloning are also used in support of *ex situ* conservation.

### Box 3.2 Cloning ways of rare wildlife species



Cloning is a type of *ex situ* conservation that increases the population of endangered species. The marbled cat (*Pardofelis marmorata*) has a high probability of increasing its population by cloning. In 2000, the embryo transfer experiment was initiated in which the embryo was transferred from a wild cat to a domestic mother cat (Parmpai and Lorthongpanich, 2002). (Photo: Jonathan Murray)

Today, the 59 species of protected wildlife (Box 3.3) are allowed to propagate thanks to the Ministerial Regulation (2003) and the Wild Animals Reservation and Protection Act in 1992; those species include :

- 🐾 Mammals - 8 species
- 🐾 Birds - 42 species
- 🐾 Reptiles - 6 species
- 🐾 Amphibians - 1 species
- 🐾 Fish - 2 species

The 59 wildlife protected species (Figure 3.2) can be divided are classified into different statuses:

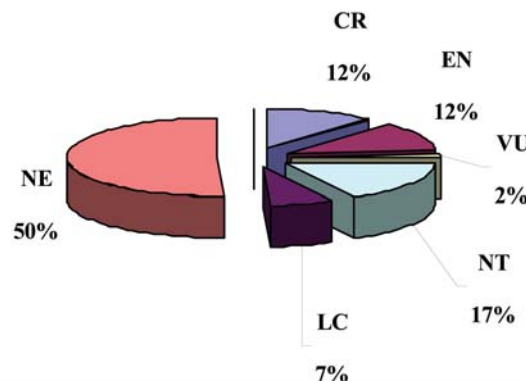
- 🐾 7 species (12%) were classified as critically endangered
- 🐾 7 species (12%) were classified as endangered
- 🐾 1 species (2%) was classified as vulnerable
- 🐾 10 species (17%) were classified as near threatened
- 🐾 4 species (7%) were classified as least concern
- 🐾 30 species (50%) were not evaluated

Population propagation is a good way to support *ex situ* conservation, especially for Hume's pheasant (*Syrmaticus humiaem*), chestnut-necklaced partridge (*Arborophila charltonii*), Malaysian peacock-pheasant (*Polyplectron malacense*), come duck (*Sarkidiornis melanotos*), Estuarine crocodile (*Crocodylus porosus*), and Siamese crocodile (*Crocodylus siamensis*) which were classified as critically endangered status.

### Box 3.3 Wildlife protected with allow to propagation

<b>Mammals</b>		
<i>Cervus unicolor</i>	<i>Tragulus javanicus</i>	<i>Muntiacus muntjak</i>
<i>Viverricula malaccensis</i>	<i>Cervus porcinus</i>	<i>Macaca nemestrina</i>
<i>Macaca mulatta</i>	<i>Macaca fascicularis</i>	
<b>Birds</b>		
<i>Rollulus rouloul</i>	<i>Gallus gallus</i>	<i>Lophura diardi</i>
<i>Lophura ignita</i>	<i>Lophura nycthemera</i>	<i>Lophura leucomelana</i>
<i>Syrmaticus humiae</i>	<i>Arborophila chloropus</i>	<i>Arborophila rufogularis</i>
<i>Arborophila cambodiana</i>	<i>Arborophila charltonii</i>	<i>Arborophila brunneopectus</i>
<i>Francolinus pintadeanus</i>	<i>Garrulax chinensis</i>	<i>Garrulax monileger</i>
<i>Garrulax pectoralis</i>	<i>Garrulax leucolophus</i>	<i>Garrulax strepitans</i>
<i>Psittacula finschii</i>	<i>Copsychus malabaricus</i>	<i>Copsychus saularis</i>
<i>Sturnus nigricollis</i>	<i>Psittacula eupatria</i>	<i>Psittacula roseata</i>
<i>Gracula religiosa</i>	<i>Psittacula alexandri</i>	<i>Pycnonotus jocosus</i>
<i>Pavo muticus</i>	<i>Polyplectron bicalcaratum</i>	<i>Polyplectron malacense</i>
<i>Loriculus galgulus</i>	<i>Loriculus vernalis</i>	<i>Psittinus cyanurus</i>
<i>Argusianus argus</i>	<i>Acridotheres tristis</i>	<i>Acridotheres javanicus (A. grandis)</i>
<i>Nettapus coromandelianus</i>	<i>Dendrocygna javanica</i>	<i>Anas poecilorhyncha</i>
<i>Anas querquedula</i>	<i>Sarkidiornis melanotos</i>	<i>Anas acuta</i>
<b>Reptiles</b>		
<i>Ptyas korros</i>	<i>Ptyas mucosus</i>	<i>Python molurus</i>
<i>Python reticulatus</i>	<i>Crocodylus porosus</i>	<i>Crocodylus siamensis</i>
<b>Amphibians</b>		
<i>Rana blythii (Limnonectes blythii)</i>		
<b>Fishes</b>		
<i>Scleropages formosus</i>	<i>Datnioides microlepis</i>	

Source: National Park, Wildlife and Plant Conservation Department (2003)



**Figure 3.2** The percentage of wildlife protected (n = 59 species) which were allowed for propagation and their ONEP classified wildlife status (2005)

**Remarks:** EX : Extinct, EW : Extinct in the Wild, CR : Critically Endangered, EN : Endangered, VU : Vulnerable, NT : Near Threatened, LC : Least Concern and DD : Data Deficient, and NE : Not Evaluated

Reintroduction is also one of the strategies to conserve endangered species (Table 3.4-3.5; Box 3.4-3.5). Thus, knowledge of wildlife biology, propagation and reintroduction techniques are very important for wildlife management, especially for helping the reintroduced wildlife adapt in new habitats. Further knowledge on genetic requiring, transfer methods, care and disease investigation, and monitoring processes are also necessary reintroduction success (Khobkhet, 1992).

### Box 3.4 Wildlife reintroduction concepts (Bhumpakphan, 2000)

- ❁ Reintroduction is the method by which wildlife species are returned into habitats where they previously existed in order to reestablish an extinct population.
- ❁ Introduction occurs when wildlife is brought into the new areas where there has been no previous record of those species' existence.
- ❁ Rehabilitation involves the return of wildlife into its natural habitat where its population still exists.

### Box 3.5 Reintroduction history

- ❁ The reintroduction of elephants under the Royal project of Queen Sirikit was organized by the Royal Forest Department. During the first stage, 3 elephants were released by Queen Sirikit at Doi Pha Muang Wildlife Sanctuary, Lampang province on 14 January 1997. Four individuals were released into the forest at two different times (2 individuals/time), making a total of 7 elephants reintroduced. The results from the research and monitoring showed that all released elephants were able to survive and adapt to their habitats like other wild elephants (*Elephas maximus*) (Angkawanish, n.d.).
- ❁ Reintroduction of Hog deer (*Axis porcinus*) under Queen Sirikit's royal project at Tung Klamung, Phu Khiew Wildlife Sanctuary took place on 23 December 1997. Six individuals (3 couples) were first released, 4 years later 21 individuals were found to living and feeding completely in the wild around the Tung Klamung and Pine forest and those of them, especially the younger generation (Khobkhet, 1992). Recently, Bhumpakphan (2000) has reported that at least 70 individuals were found.





Hog deer (*Axis porcinus*)  
(Photo: Prateep Duengkae)



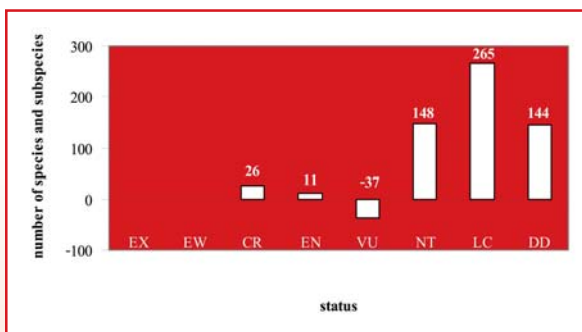
Elephant (*Elephas maximus*)  
(Photo: WCS Thailand)

## Extinction from the past to the present

The evaluation of biodiversity resources in 1996 and 2005 found that the endangered status of vertebrates and wildlife are the same (Figure 3.3) :

-  6 species in extinct status
-  7 species in extinct in the wild status

Revision has updated the status of the Milky stork (*Mycteria cinerea*) from extinct in the wild to critically endangered, and has raised the status of the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) from critically endangered to extinct in the wild. The numbers of critically endangered, endangered, near threatened, least concern and data deficient species have increased from 1996, however, the numbers of vulnerable species have decreased from 1996.



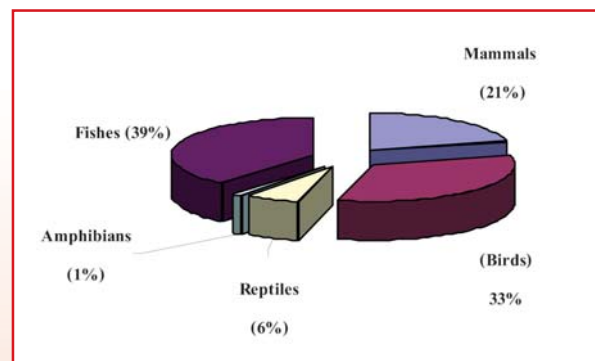
**Figure 3.3** Changing of wildlife status from the evaluation results in 1996 and 2005.

**Remarks:** EX: Extinct, EW: Extinct in the Wild, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, and DD: Data Deficient.

## How does classification lead to extinction?

There are disadvantages to assessing and labeling wildlife as critically endangered or threatened as they become targets for collectors of rare species. They become highly valued and expensive commodities and instead of their threatened status resulting in their protection and conservation, they fall victim to illegal hunting and trade, and finally extinction.

When comparing the types of wildlife that are categorized as threatened (including critically endangered, endangered, and vulnerable), it was found that 39% of threatened species were fish, 33% were birds, 21% were mammals, 6% were reptiles and 1% were amphibians which are the most likely to become extinct in the wild in Thailand in the future (Figure 3.4).



**Figure 3.4** The percentage of vertebrate groups, mammals, birds, reptiles, amphibians, and fish, and their status: critically endangered, endangered, and vulnerable.

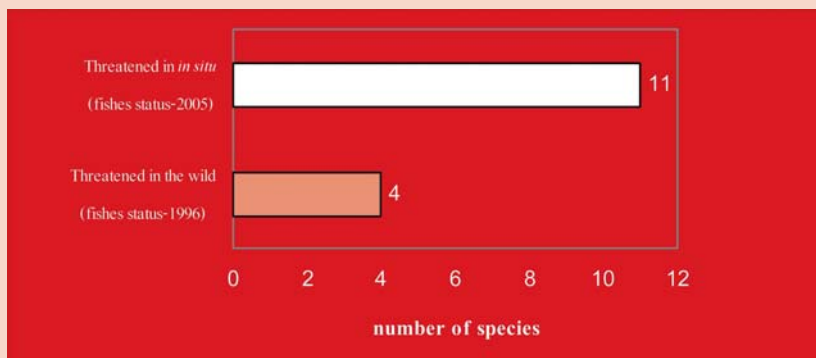


### Box 3.6 Threatened species trends of Thailand from 1996 to 2005

Trends of Extinct in the Wild and Vulnerable species have increased from the past.



### Box 3.7 Threatened species (fishes) trends of Thailand from 1996 to 2005



## Wildlife distribution in the past and causes of extinction

Species that need the specific or small habitats are at a larger risk to extinction than others such as the Siamese schilbeid catfish (*Platytrapius siamensis*) and Schomburgk's deer (*Cervus schomburgki*). Both are endemic to Thailand and are already clarified as extinct from both Thailand and the world too. Thailand has to promote habitat conservation to prevent other threatened species from extinction as with these two extinct species. Nowadays, although many conservation areas

have been declared in Thailand, disturbances from human activities are still decreasing the number of species.

The distribution map of extinct and extinct in the wild species (Figure 3.5 and Table 3.1) showed that the habitat around the Central Plains and the Andaman coast were the critical areas where many species are already extinct. The main causes of extinction and declining species are due to the conversion of natural habitats to urban areas, agricultural areas, and resorts for tourism, followed by severe hunting, pollution and wildlife adaptation.

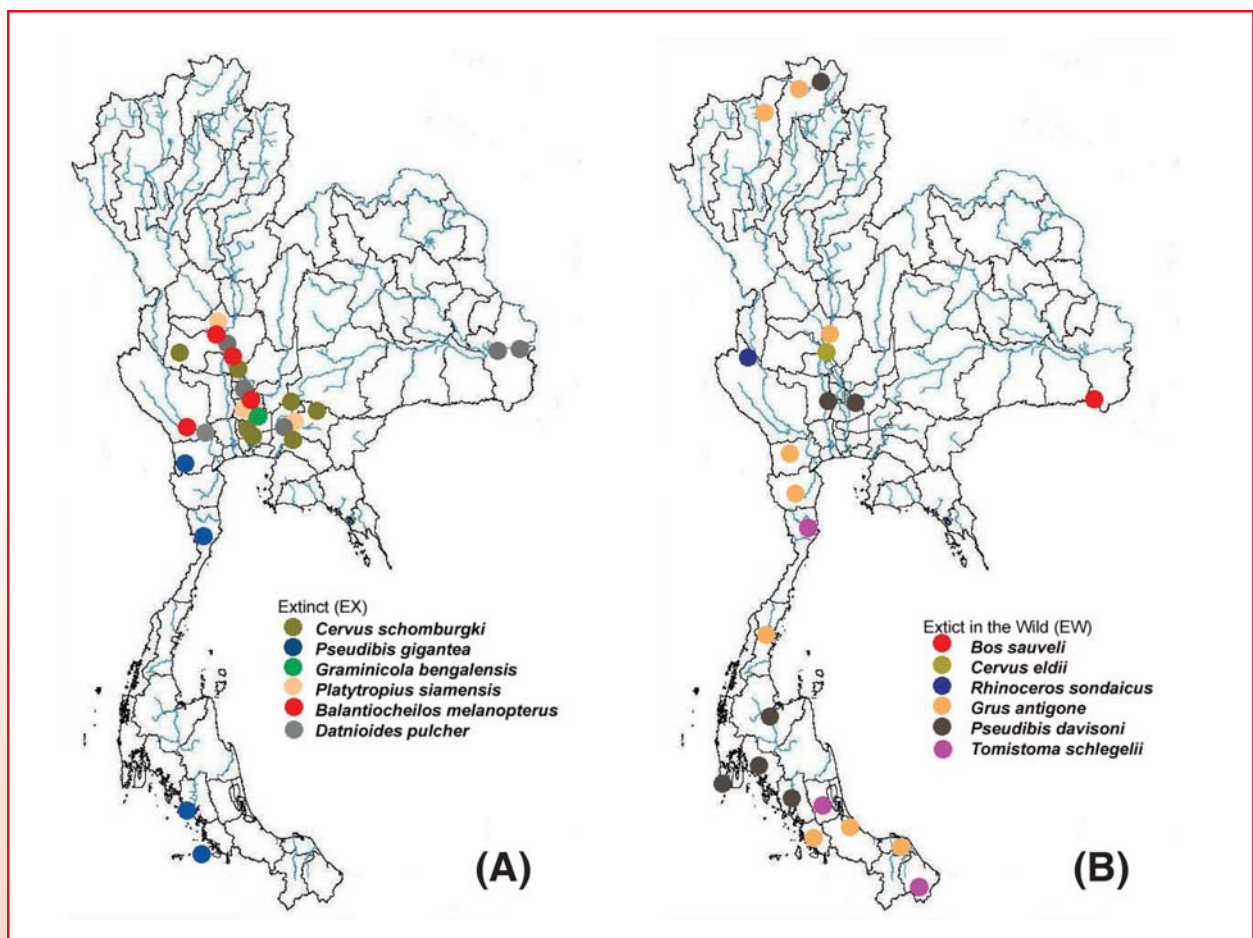




Figure 3.5 Wildlife distribution map in the past: (A) Extinct, and (B) Extinct in the wild.

Table 3.1 Wildlife extinction causes in Thailand

Common name	Scientific Name	Extinction causes
 <b>Extinct-EX status</b>		
Schomburgk's deer	<i>Cervus schomburgki</i>	■ ■
Giant ibis	<i>Pseudibis gigantea</i>	■ ■
Large grass-warbler	<i>Graminicola bengalensis</i>	■
Bala shark	<i>Balantiocheilos cf. melanopterus</i>	■ ■
Siamese tiger perch	<i>Datnioides pulcher</i>	■ ■
Siamese schilbeid catfish	<i>Platytrapius siamensis</i>	■ ■
 <b>Extinct in the Wild-EW status</b>		
Kouprey	<i>Bos sauveli</i>	■ ■
Eld's deer	<i>Cervus eldii</i>	■ ■
Lesser one-horned rhinoceros	<i>Rhinoceros sondaicus</i>	■ ■ □
Sumatran rhinoceros	<i>Dacerorhinus sumatrensis</i>	■ □
Sarus crane	<i>Grus antigone</i>	■ ■ □
White-shouldered ibis	<i>Pseudibis davisoni</i>	■ ■ □
False gaviel	<i>Tomistoma schlegelii</i>	■
<b>Remarks :</b>	■ habitat destruction      ■ hunting      ■ water pollution	
	□ breeding limitation      □ low adaptation	

Source: Thailand Institute of Scientific and Technological Research (1990)

# Zoogeography



**Figure 4.1** The limestone rat (*Niviventer hinpoon*) is listed as Endangered-EN and endemic in Thailand. It can only be found in limestone caves around Amphor Kangkoi, Saraburi province, and Wat Phra Tat, Amphor Muang, Lopburi province. However, with recently changing environments and the ignorance and introduction of cats and dogs by local villagers, the population and habitat of the limestone rat have been severely disrupted (Thailand Institute of Scientific and Technological Research, 1990). (Photo: Surachit Wangsothon)






There are certain wildlife species that can only be found on certain continents or in specific regions of the world. However, there are other groups that can be found in almost every region of the world. This all depends on the animals' adaptability and the

environmental changes. In depth studies have revealed that some species were distributed on different continents in the past (but that are no longer there now) due to continental drift, evidenced from fossil records.

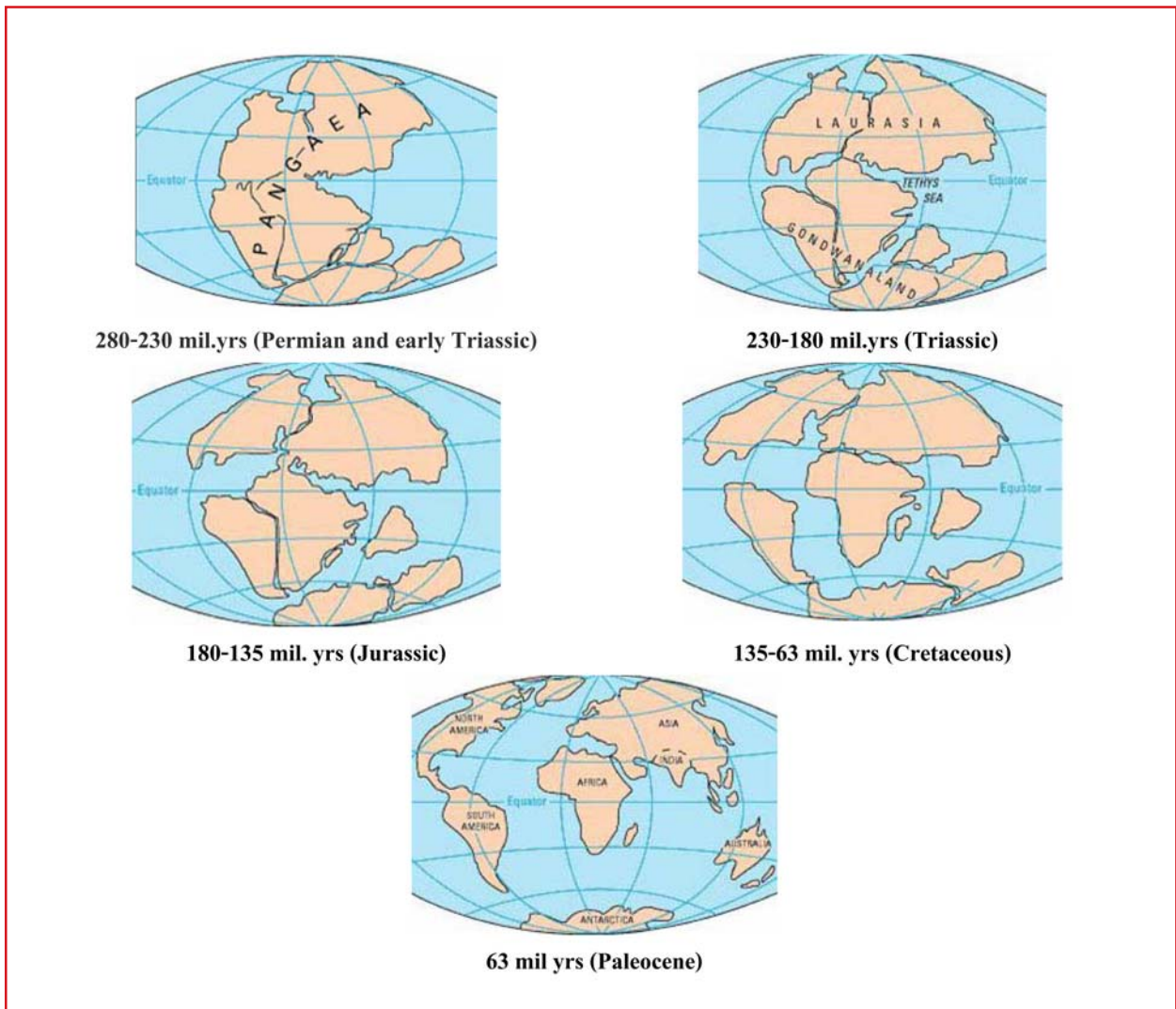
### BOX 4.1 Continental drift theory

Continental drift theory was proposed by Alfred Wegener in 1912 and is was very important knowledge for both biogeographers and paleontologists. The theory indicates that all the continents were once connected as one land mass called, Pangaea about 3,000 million years ago, which then later drifted and eventually separated into the continents we know of today. Fossil records display relationships between the continents in the past. The plate tectonic concept, paleontology, and other progressive technologies were later able to further support the continental drift theory as it is now accepted today (Figure 4.2).

Dietz and Holden (1970) cited from Chimchome (1999), stated that:

-  During the Permian and early Triassic, 280-230 million years ago, only one continent, namely Pnagaea, existed and was one sea called, Panthalassa.
-  During the Triassic period, 230-180 million years ago, two continents formed: 1) Laurasia, located in the north including north America, Europe, and Asia, and 2) Gondwanaland, located in the south including south America, Africa, Antarctic, India and Austria.
-  During the Jurassic period, 180-135 million years ago, Gondwanaland separated into south America and Africa, while the Indian sub-continent rapidly moved up to the north with the higher speed than other continents.
-  In the Cretaceous period, 135-63 million years ago, south America and Africa completely separated and the plate of India had moved away from the equator, while Asian part of Laurasia moved closer to Africa. The Atlantic Ocean expanded and separated Greenland from Laurasia.
-  Lastly, during the Paleocene era, 63 million years ago, there was constant movement and change. Presently, India is connected to Asia, Australia completely separated from the Antarctic, the Atlantic Ocean separates North America from Europe, and Asia is closer to North America on the northwest.






**Figure 4.2** Plate tectonics of the world from the past to present  
**Source:** <http://geology.com/pangea-continental-drift.gif> (2005)

## Zoogeographic regions

The world is divided into 7 zoogeographic regions (Figure 4.3) according to wildlife and plant distribution, climatic and topographic conditions (Wallace, 1876, cited from Khobkhet, 1998) and are described below:

 Palearctic region - is comprised of northern Asia, all of Europe, and northern Africa from the Sahara Desert upwards. This region is the largest terrestrial zoogeographic region of the world and is warm in temperature in most areas but does experience extreme cold weather in others. The main

vegetation that covers this region consists of pines and deciduous trees. Deserts are spread throughout the Palearctic region, especially in the southern part. The wildlife that can be found here includes reindeers, moose, gazelles, camels, and Siberian tigers. Nearctic region - is made up of the entire North American continent. Plant life is very diverse here, ranging from semitropical thorn forests to the Arctic tundra forests. The climate ranges from subtropical to warm and cold temperature, with deserts spread through some parts. Elks, bison and brown bears can be found here.

Neotropic region - is comprised of the entire South American continent, from Mexico onwards. The climate in this region varies and fluctuates often. The vegetation here is varied, including tropical rain forests, tropical savannas and grasslands, some desert areas in the south, mountain forests and alpine tundra can be found on the west. Dominant wildlife species include white-tailed deer, sloth, giant anteater and Andean tapir.

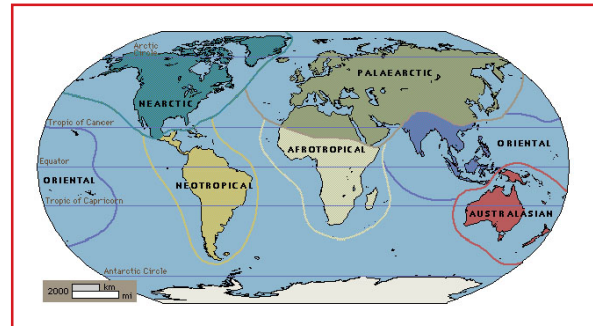
Ethiopian region - includes Madagascar, the African continent from Sahara Desert down to south Arabia, separating from the Palearctic region at the Suez Canal. Tropical forests, mountain forests, grassland forests and grassland alpine forests cover this region. The abundant wildlife includes African buffalos, zebras, giraffes, white rhinoceroses, black rhinoceroses, hyenas, lions, and African elephants.

Oriental region - is made up of India, South East Asia, South China, Indonesia, Philippines, and all the islands in the Indian and Pacific Oceans, and separated from the Palearctic region by the Himalayas. Most of the vegetation cover consists of tropical forests with a few desert areas. Wildlife found here includes sambar deer, barking deer, leopards, tigers, Asian two-horned rhinoceroses, lesser one-horned rhinoceroses, and wild water buffalos.

Australian region - consists of the Australian continent including Australia, New Zealand, Tasmania, New Guinea islands, some of the Indonesian islands and the Pacific islands. The vegetation cover is mostly made up of tropical forests, grasslands and some desert areas. Existing wildlife includes kangaroos, koalas, duck-billed platypuses, and anteaters.

Oceanic region - is made up of all the islands excluding the ones in the Orient and Australian regions. The climate and

vegetation varies depending on the site, while the wildlife are aquatic species including whales, dolphins, seals, dugong and sea lions.

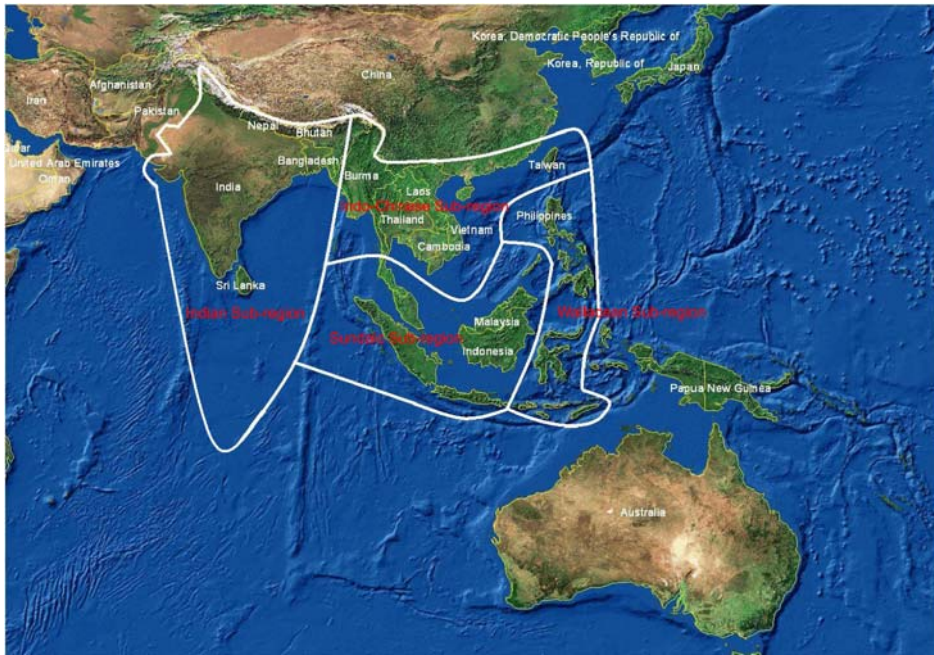


**Figure 4.3** Map of the world zoogeographic regions.

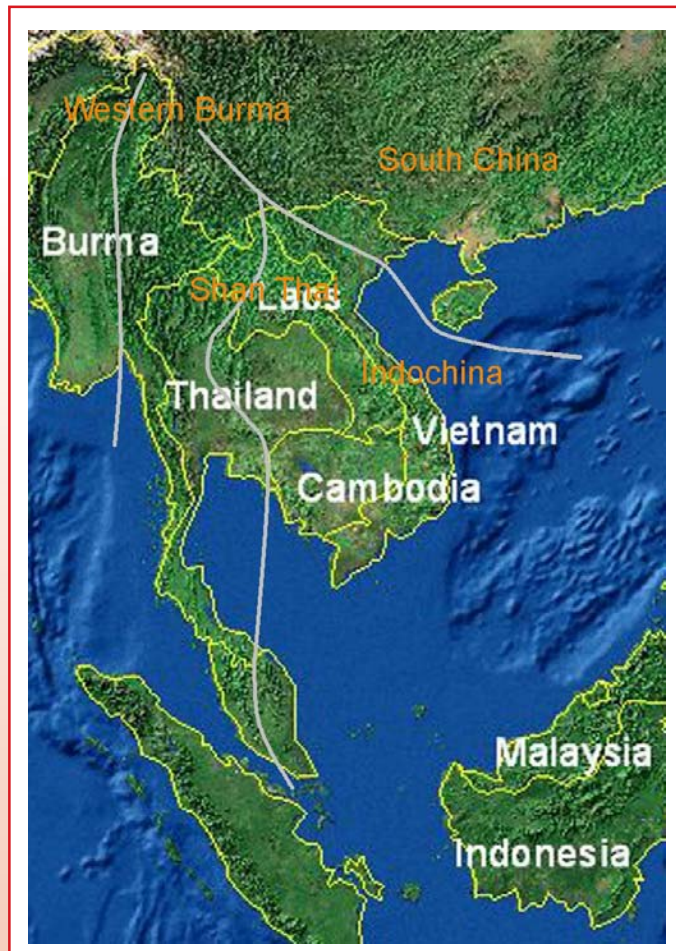
**Source:** [http://encarta.msn.com/media\\_461536032/Zoogeographic\\_Regions.html](http://encarta.msn.com/media_461536032/Zoogeographic_Regions.html) (2005)

The Oriental region is divided into 4 sub-regions: Indian, Indochinese, Sundaic and Wallacean. Thailand is located between the Indochinese and Sundaic sub-regions, at a latitude of 10° 30' North (Figure 4.4). Chumphon province up to the northern most part of Thailand is considered part of the Indochinese sub-region, while Chumphon province southwards to the San Ka La Kiri mountain ranges at the border is part of the Sundaic sub-region. The wildlife distribution in the Oriental region ends at an imaginary line called, Weber's line which prohibits wildlife from moving into the Australian region, while the Australian region wildlife cannot cross over into the Oriental region at Wallace's line. The area between both lines is called the Wallacean sub-region and includes all of the islands in the Philippines, Timor, Sulawesi and some small islands beside Indonesia. The Wallacean sub-region is where wildlife from both the Oriental and Australian regions can be found together (Bhumpakphan, 2000).





**Figure 4.4** Oriental region included 4 sub-regions as Indian, Indochinese, Sundaic and Wallacean  
**Source:** MacKinnon and MacKinnon (1986)



**Figure 4.5** Shan Thai block and Indochina block

## BOX 4.2 The Origin of Thailand's Present Location



Geologists believe that Thailand originated from two landmasses that separated from Gondwanaland and later collided and joined during the Triassic period (200 million years ago). The first landmass is known as the Indo-China lands and covers the high plateau of Korat, Cambodia, Laos, Vietnam, and the eastern side of the Malaysian peninsula, while the second landmass, called the Shan-Thai lands, covers the Shan state of Myanmar, the western region of Thailand down to Malaysia (Figure 4.5). Evidence of the collision of the two landmasses can be taken from the presence of ophiolite rocks found in Nan and Utaradit provinces in Thailand and in the Malaysian peninsular. The rocks are made of magnetic minerals originating from the magma under the ocean and were pushed up as the two landmasses joined. Both landmasses moved northwards until they connected with Laurasia at the south of China and formed what we know today as Thailand (Pintuphan, 1996; Tuntivittayapitak, 1996).



A wildlife distribution study of Thailand and its neighboring countries revealed dinosaur fossils of *Phuwiangosaurus sirindhornae* and *Siamotyrannus isanensis* that existed during the Cretaceous period (130 million years ago) at Phu Wiang National Park, Khon Kaen province. In addition, *Dinotherium* elephant fossils from the family *Dinotheriidae* family were discovered at Amphor Phong, Phayao province. They only have lower tusks for digging and existed during the Tertiary period. *Mastodon* (*Gomphotherium*) fossils of the *Gomphotheriida* family from the late Tertiary period were also found. This species had both upper and lower tusks which later would evolve into the modern day elephant of the *Elephantidae* family. During the past 18,000 years, it's been found that the sea level surrounding Thailand and its neighboring countries has lowered over 85 meters than present levels. Back then, the Gulf of Thailand was still terrestrial land, covered with forests and connected to the Indo-China peninsula, Sumatra, Java, and Borneo, also known as Sundaland. Evidence to support this claim was accidentally uncovered during crude oil excavation in the Gulf of Thailand when underwater limestone caves were found with bat fossils and pollen of various primitive pines. During that time, wildlife was widely distributed in the area: the white-handed gibbon (*Hylobates lar*) was spread from the Malaysian Peninsula to the island of Sumatra. The tiger (*Panthera tigris*), leopard (*Panthera pardus*), dhole (*Cuon alpinus*), lesser one-horned rhinoceros (*Rhinoceros sondaicus*), and banteng (*Bos javanicus*) distribution reached the islands of Sumatra Java. The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) and the Asian tapir (*Tapirus indicus*) were found on Sumatra island and Borneo island, however, the Asian tapir (*Tapirus indicus*) population became extinct from Borneo. The gaur (*Bos javanicus*) reached the Indochinese region later than the other groups of animals and thus no record of it can be found on Sumatra, while the wild elephant did reach Sumatra. Following this period, there was another change in sea levels approximately 8,500 years ago; about 8 meters above present day levels. This caused the Sundaic land to sink underwater. Evidence of flooding over the Central region came from the discovery of giant oyster shells in Amphoe Lat Lum Kaeo, Pathum Thani province, and Soi Sena in Bangkok, which are the same species found in the cold seas of Siberia and Japan. Erosion from seawater at a height of almost 10 meters above land in Hua Hin, Prachuap Khirikhan province is also supporting evidence. These geographic changes resulted in changes in forest cover and on the ocean floor, particularly at Koh Kod Kra which is the narrowest landmass where wildlife can migrate through. This area is thus divides terrestrial wildlife into the local populations topographically, allowing geographical subspecies to later develop (Pintuphan, 1996; Tuntivittayapitak, 1996; Bhumpakphan, 2000).

Wildlife distribution in the Indochinese and Sundaic sub-regions, Thailand:

**Mammals:** Most of them are distributed in fragmented forests of the conservation areas. Reports show that 16 species of Murines can be found in the Indochinese sub-region, 6 species in the Sundaic sub-region, and 14 species can be found in both sub-regions (Chaimanee, 1997).

**Birds:** Local bird reports showed that 190 species (39%) and 150 species (31%) can be found in the Indochinese and Sundaic sub-regions, respectively, while 152 species can be found in both areas ( $11^{\circ}$ - $13^{\circ}$  N) (Hughes *et al.*, 2003; Round *et al.*, 2003; Woodruff, 2003) (Figure 4.6)

**Reptiles;** 94 (29.2%) and 85 (26.4%) species can be found in the Indochinese and Sundaic sub-regions, respectively, and 143 species (44.4%) in both areas (Figure 4.7).

**Amphibians;** 45 (34.4%) and 43 (32.8%) species can be found in the Indochinese and Sundaic sub-regions, respectively, and 43 species (32.8%) in both areas (Figure 4.8). (Nabhitabhata *et al.*, 2000).

At least 2,820 species of fish can be found and are divided into 720 species of freshwater fish, and 2,100 species of marine fish. For freshwater fish, 329 species can be found in the Chao Phraya River, 290 species in the Thai part of the Mekong River system, 270 species in the river systems of the south, 207 species in the Mae Klong River, 166 in the rivers of eastern region, and 111 species in the Salawin River system (Vidthayanon *et al.*, 1997). A comparison of the similarity of fish between each river system showed that the fish in the Chao Phraya River and Mekong river systems had the highest similarity index (68.2%), followed by the Chao Phraya and Mae Klong river systems (67.8%), while the Mekong and Salawin River systems were least similar (17.4%) (Figure 4.9).

## Zoogeographic regions of Thailand

The zoogeographic regions of Thailand are divided into 6 regions according to the wildlife distribution patterns, habitat, and vegetation cover (Figure 4.10) (Deignan, 1945; King *et al.*, 1975; Lekagul and Round, 1991 cited from Khobkhet, 1998).



**Northern region:** is made up of mountains and is home to a large variety of wildlife habitats such as hill evergreen forest, pine forest, mixed deciduous forest, and deciduous dipterocarp forest. The boundary of the northern region runs north up to Myanmar and Laos, south to the Central region of Thailand (from latitude  $17^{\circ} 47' N$  upwards), east to Northeastern region of Thailand (from longitude  $101^{\circ} 30' E$ ). Deignan (1945) had divided the northern region into 3 parts: 1) the upper northern part including the watershed areas of Ping, Wang, Yom, and Nan (the part which flows into the Mekong River) Rivers; 2) the western part that includes the western side of the Khun Tan mountain range; and 3) the eastern part that is made up of the eastern side of Khun Tan mountain range.



**Central region:** This area is mostly floodplain or slightly hilly. Presently, only very few forests are still in pristine condition as most have been converted into agricultural lands such as rice paddy fields and orchards. The central region borders the north at a latitude of  $17^{\circ} 47' N$ , the west at the Western region of Thailand (longitude  $99 - 100^{\circ} E$ ), the south at the Southern (latitude  $12^{\circ} N$ ) and Southeastern regions of Thailand, and in the east at the Northeastern region of Thailand (latitude of  $101^{\circ} 30' E$ ).



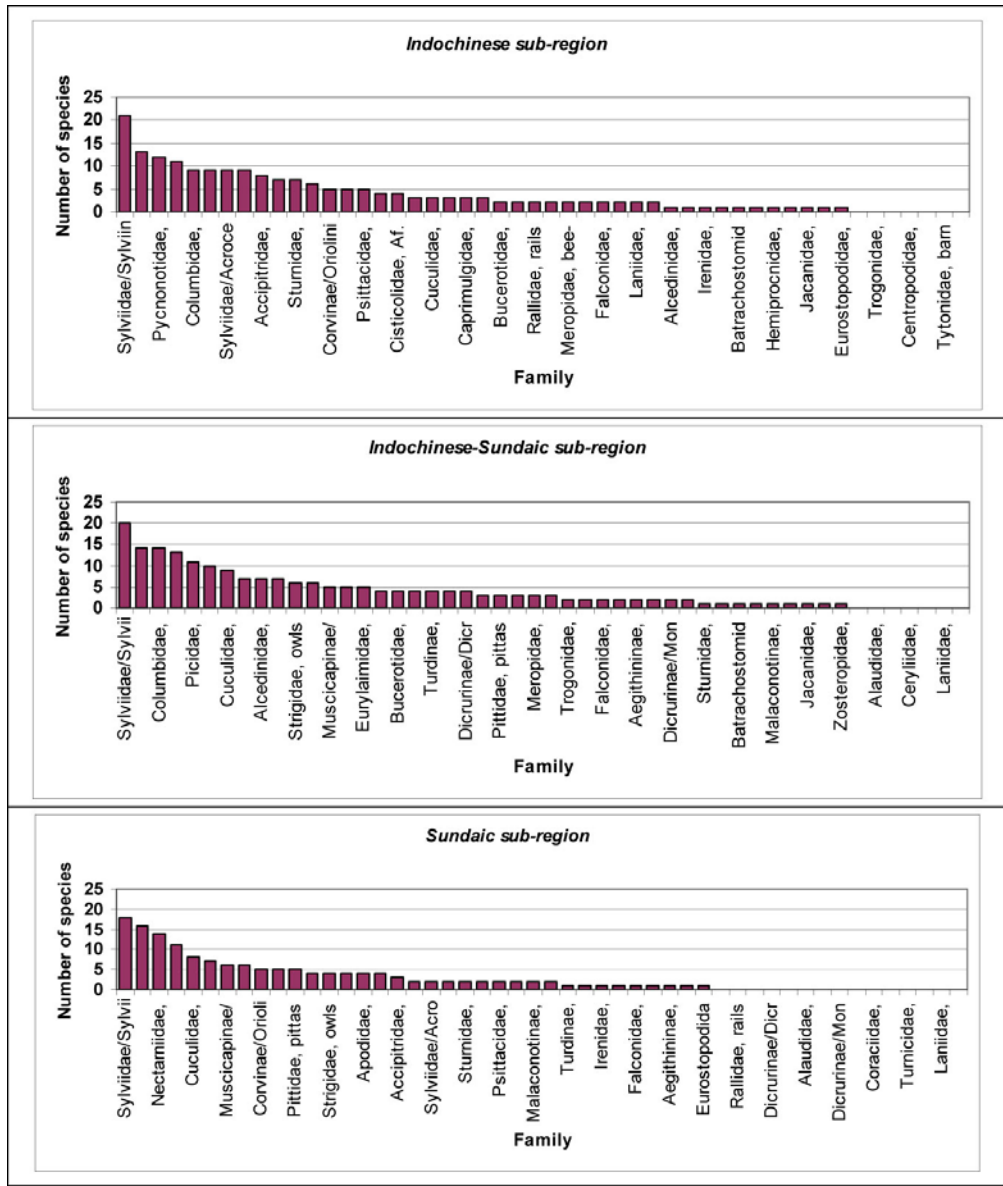


Figure 4.6 Bird distribution in the Indochinese and Sundaic sub-regions, Thailand.

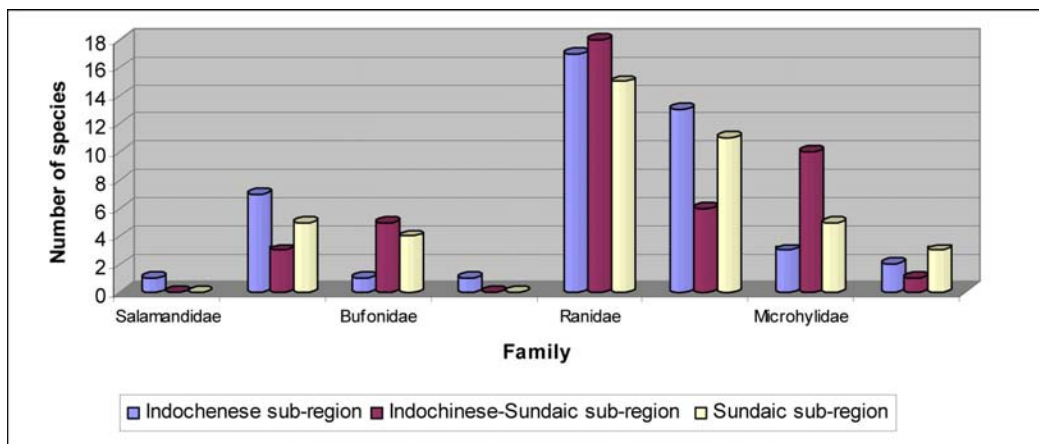
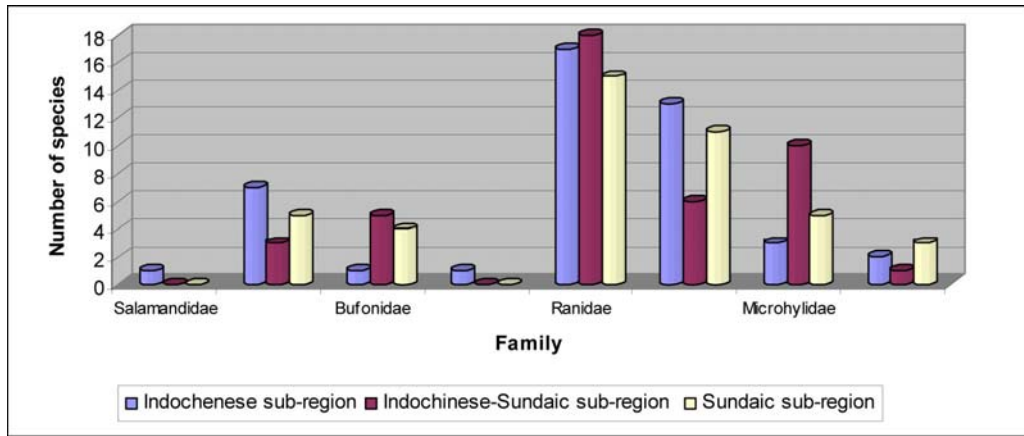
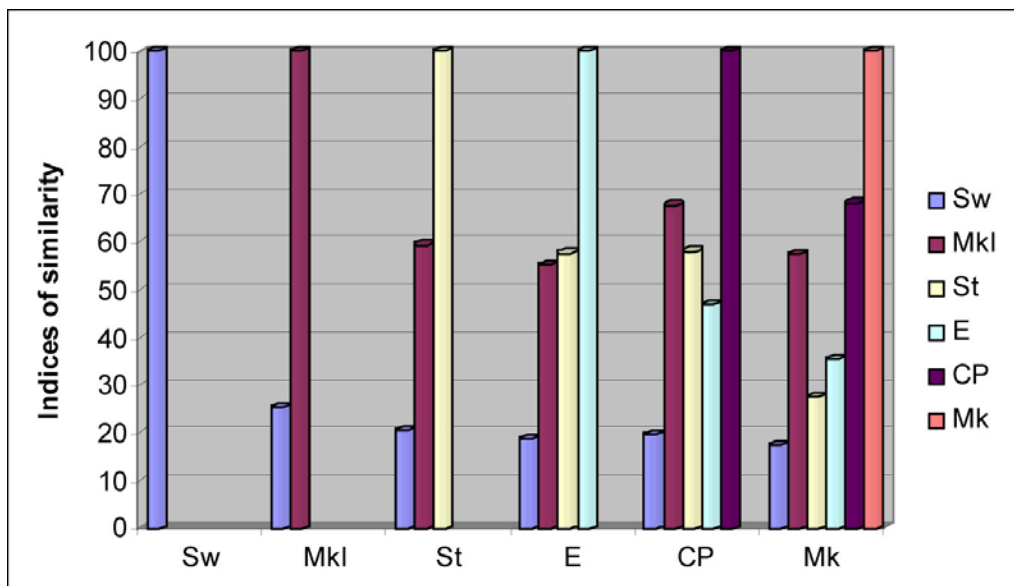


Figure 4.7 Distribution of reptiles in the Indochinese and Sundaic sub-regions.





**Figure 4.8** Distribution of Amphibians in the Indochinese and Sundaic sub-regions.



**Figure 4.9** The similarity index chart of fresh water fish between the river systems in Thailand.  
**Remark:** Sw: Salawin river system, Mkl: Mae Klong river system, St: Southern river system, E: Eastern river system, CP: Chao Praya river system and Mk: Mekong river system



Western region: This area is comprised of small hills and faces a lot of drought as it is located in the rain shadow side of Tanaow Sri mountain range which bounds Thailand and Myanmar. It is mostly made up of Deciduous dipterocarp forest, Mixed deciduous forest, and bamboo forest areas. The northern part of this region reaches the Northern region of Thailand, Myanmar on the west, Southern Thailand in the



south, and Central Thailand in the east, including some parts of Tak province, Uthai Thani, Kanchanaburi, Ratchaburi, Phetchaburi, and some parts of Prachuap Khirikhan province.

Northeastern region: This region comprised of high plateaus with some small hills. The rainy season is very short here. The forest types mainly are mainly deciduous dipterocarp forest, some Pine forest, Dry evergreen forest,

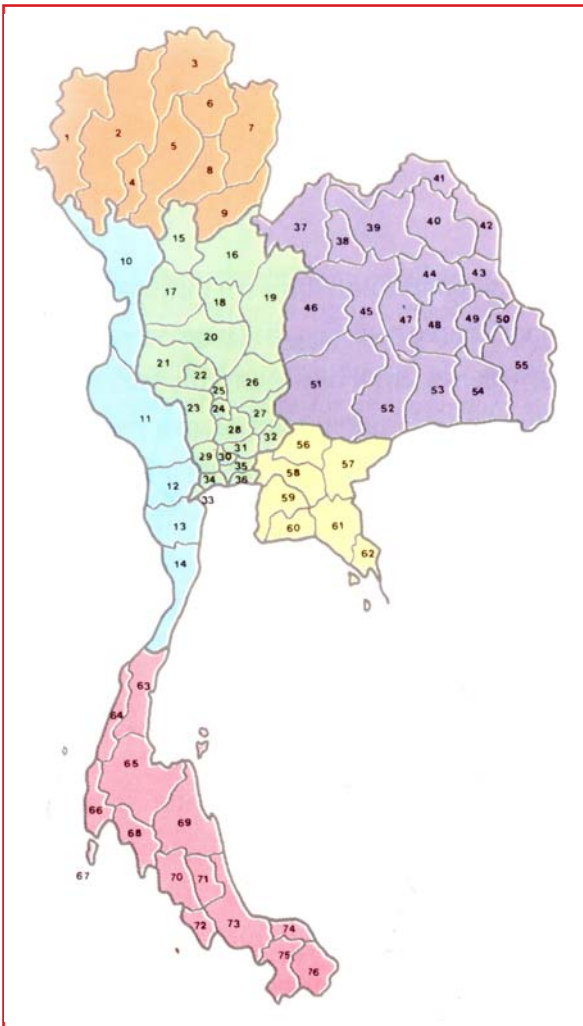


Figure 4.10 Zoogeographic regions in Thailand.



Southeastern region: This region is made up of 7 provinces including Prachin Buri, Srakaew, Chon Buri, Rayong, Chanthaburi, Chachoengsao, and Trat provinces. The boundary areas include the Central and the Northeastern Thailand in the north, the Gulf of Thailand in the south, and Cambodia in the east. The amount of annual rainfall is quite high and the species of plants and wildlife are similar to that of the Southern region. (Chachoengsao province was added in this region to coincide with the regional division of the country).



Southern region: This area runs from Prachuap Khirikhan province (latitude 12° N) down to Malaysia, the Andaman Sea and Indian Ocean in the west and the Gulf of Thailand in the east. This region has the longest period of rain and highest amount of rainfall of all the regions, in which the western part runs from April to November, and in the east lasts from September to January. Moist evergreen forests are the main forest types with rubber plantations and agricultural areas.

and some hill evergreen forest. The Mekong River, which borders Thailand and Laos, borders the north of this region, while the Northern and Central regions of Thailand lies on the west (longitude 101° 30' E). In the south are the Southeastern region of Thailand and Cambodia, bordered by the Phanom Dong Rak mountain range. The west of this region ends at Laos and Cambodia. This region may be divided into 2 parts, upper and lower, or sometimes known as northern and southern Isarn, with the Chi and Moon Rivers as the divide.

## BOX 4.3 Important and interesting areas of bird distribution according to the zoogeographic regions of Thailand (Sanguansombat, 2005)

### Northern region

- ❁ Chiang Dao Wildlife Sanctuary, Chiang Mai province: This area is the most unique areas of Thailand. It has been reported that Hume's pheasant (*Syrmaticus humiae*) - critically endangered status, Deignan's babbler (*Stachyris rodolphei*) - endemic species, and giant nuthatch (*Sitta magna*) - vulnerable status, were found only in this area.
- ❁ Mekong riverside, Chiang Saeng district; Wetlands of Nong Bong Kai non-hunting area, Chiang Rai province, which is an International Ramsar Site in Thailand. Globally threatened bird species can be found here as well as various waterfowl species during the winter season such as the threatened great thick-knee (*Esacus recurvirostris*), black-bellied (*Sterna acuticauda*), river tern (*Sterna aurantia*), and the critically endangered Bare's pochard (*Aythya baeri*). At Doi Phukha, Nan province, the beautiful nuthatch (*Sitta formosa*), a globally threatened bird species that is critically endangered in Thailand can be found.
- ❁ Doi Phu Nang, Phayao province, is considered the most important place for conserving the critically endangered green peafowl (*Pavo muticus*).

### Central region



- ❁ Bung Boraphet, Nakorn Sawan province, is home to many endemic birds species such as white-eyed river-martin (*Pseudochelidon sirintarae*) - critically endangered status, Bare's pochard (*Aythya baeri*) - endangered status, and the painted stork (*Mycteria leucocephala*) - vulnerable status.
- ❁ The plains of the Central region of Thailand: many species of world threatened bird species can be found here and is the habitat and breeding site of 200,000 species of waterfowl. Nationally threatened species such as greater adjutant (*Leptoptilos dubius*) - critically endangered, and spot-billed pelican (*Pelecanus philippensis*) - vulnerable status, are also found here.
- ❁ Inner Gulf of Thailand: includes the coastal areas of the Gulf of Thailand on the west starting from Laem Phak Bia, Phetchaburi province, to Chon Buri province in the east. This is a very important site for migration of mangrove birds and nationally threatened birds such as Nordmann's greenshank (*Tringa guttifer*), spoon-billed sandpiper (*Calidris pygmeus*) - critically endangered, and Asian dowitcher (*Limnodromus semipalmatus*) - vulnerable.
- ❁ Limestone mountain ranges in Saraburi province is where the vulnerable limestone wren-babbler (*Napothera crispifrons calcicola*) can be found.

### Western region



- ❁ The western region is made up of several important, large forest complexes, which includes Huai Kha Khang, Thung Yai Naresuan, and Um Phang Wildlife Sanctuaries and the Mae Wong National Park. Many globally and nationally threatened bird species can be found here: the critically endangered white-billed duck (*Cairina scutulata*), the endangered rufous-necked hornbill (*Aceros nipalensis*), plain-pouched hornbill (*Aceros subruficollis*), and green peafowl (*Pavo muticus*), and the vulnerable Burmese yuhina (*Yunina humilis*) which can only be found in Thailand and Myanmar.
- ❁ Kaeng Kra Chan National Park, Phetchaburi province: is important as it is the border of the Sundaic, Indochinese and China-Himalai zoogeographic sub-regions where important and threatened birds species such as the endangered plain-pouched hornbill (*Aceros*

## BOX 4.3 (continue)



*subruficollis*), white-fronted scops-owl (*Otus sagittatus*), and the vulnerable giant pitta (*Pitta caerulea*), and blue-banded kingfisher (*Alcedo euryzona*) can be found.

-  Khao Sam Roi Yod National Park: an international wetland Ramsar site, where a large variety of migratory waterfowl and mangrove birds such as the endangered Nordmann's greenshank (*Tringa guttifer*), spoon-billed sandpiper (*Calidris pygmeus*), greater spotted eagle (*Aquila clanga*) can be found. It is also the nesting site of the Malaysian plover (*Charadrius peronii*).
-  Tall can sugar bushes in threatened wetlands such as the freshwater ponds in Khao Sam Roi Yod National Park are habitats to the endangered Manchurian Reed Warbler (*Acrocephalus tangorum*).





### Northeastern region

-  The Mekong wagtail (*Motacilla samveasinae*) - data deficient status - were reported long the Mekong River, especially in the Kong Chiam district, Ubon Ratchathani province.
-  Wetland areas in Buri Ram province, especially, in Ang Keb Nam Sanambin, Huai Chorakaemak, and Huai Talad Non-Hunting Areas: A large variety of threatened waterfowl species can be found here including the vulnerable painted stork (*Mycteria leucocephala*) and the milky stork (*Mycteria cinerea*), which defined as extinct in the wild status in 1996 but was recently was classified as critically endangered.

### Southeastern region or Eastern region

-  Ang Rue Nai Wildlife Sanctuary, Chachoengsao province, is the only area to report findings of the the woolly-necked stork (*Ciconia episcopus*) - endangered status.
-  Soi Dao Wildlife Sanctuary, Chanthaburi province, is where the endemic chestnut-headed partridge (*Arborophila cambodiana*) - only found in Thailand and Cambodia - can be found. It is a globally threatened bird species and is endangered in Thailand.

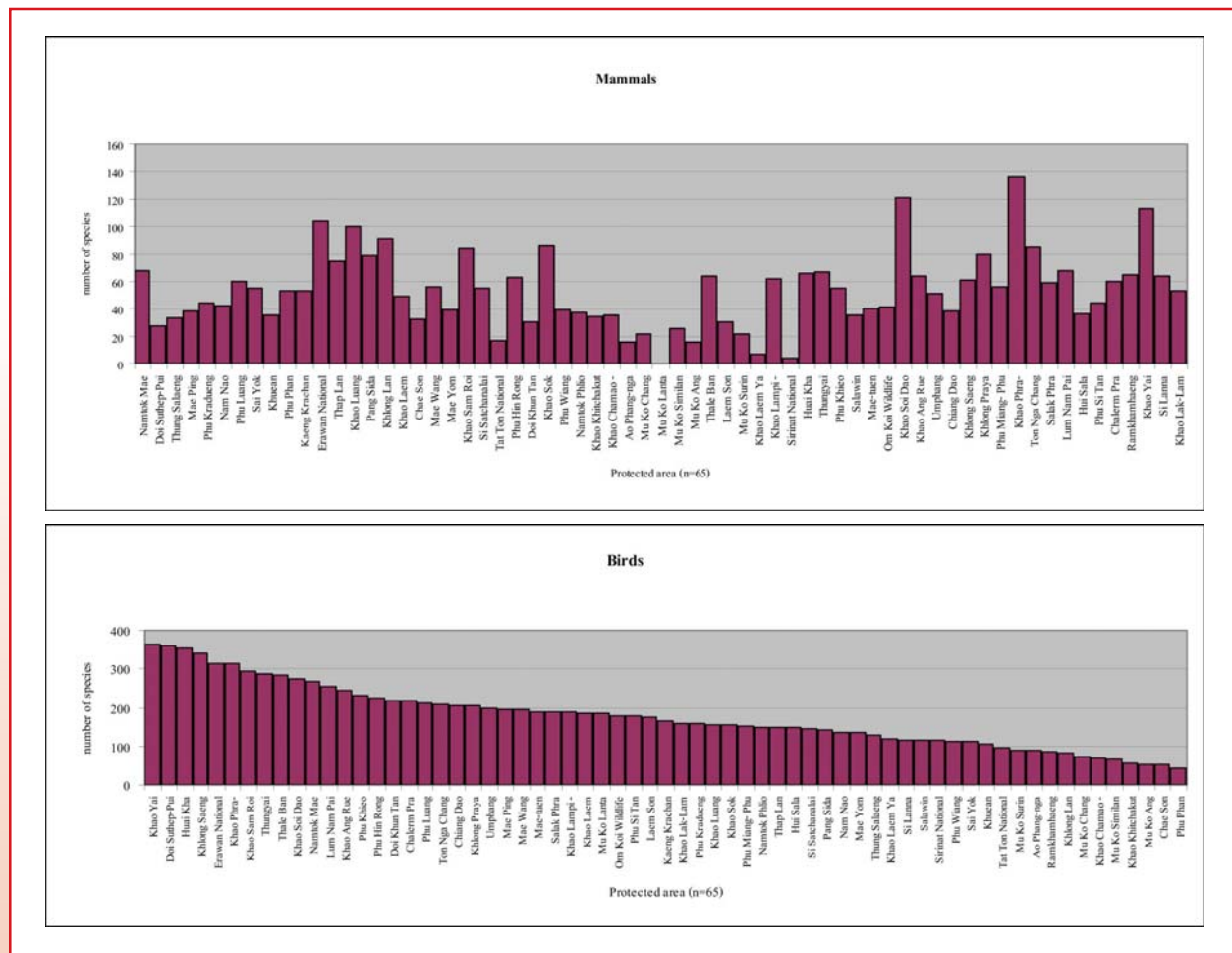
### Southern region

-  Phra Thong Island, Pangnga province, is unique in topography. A lot of nationally threatened bird species have been found here such as the critically endangered grey-headed fish-eagle (*Ichthyophaga ichthyaetus*) and cinnamon-headed pigeon (*Treron fulvicollis*) and vulnerable pale-capped pigeon (*Columba punicea*).
-  Khao Pra-Bang Kram Wildlife Sanctuary, Krabi province, is the only place in Thailand where the critically endangered Gurney's pitta (*Pitta gurneyi*) can be found.
-  Phu Toe Daeng Peat Swamp Forest is home to several important bird species such as the critically endangered grey-headed fish-eagle (*Ichthyophaga ichthyaetus*), lesser adjutant (*Leptoptilos javanicus*), black hornbill (*Anthracoceros malayanus*), and vulnerable Malaysian blue flycatcher (*Cyornis turcosus*).
-  Hala-Bala Wildlife Sanctuary, Yala and Narathiwat province, is mostly covered by moist evergreen forest, where threatened bird species such as the critically endangered rufous-necked hornbill (*Aceros corrugatus*), the endemic Mountain Peacock-Pheasant (*Polyplectron inopinatum*) (to Thailand and Malaysia), and the endangered Wallace's hawk-eagle (*Spizaetus nanus*), plain-pouched hornbill (*Aceros subruficollis*), Short-toed Coucal (*Centropus rectunguis*), and giant pitta (*Pitta caerulea*) can be found.

## Distribution of vertebrates in Thailand

Wildlife data from the 65 conservation areas (Forestry research center, 2005) found that the highest numbers of mammals (136 species) was found at Khao Pra-Bang Kram Wildlife Sanctuary, followed by Khao Soi Dao Wildlife Sanctuary (121 species) and Khao Yai National Park (113 species). While, the highest species numbers of birds was found at Khao Yai National Park (365 species) and followed by Doi Suthep-Pui National Park, Huai Kha Khaeng Wildlife Sanctuary, Khlong Sang Wildlife Sanctuary, Erawan National Park and Khao Pra-Bang Kram Wildlife Sanctuary with the number of 359, 355, 340, 314, and 313 species, respectively. The highest species

numbers of reptiles were found at Khao Pra-Bang Kram Wildlife Sanctuary (119 species), followed by Huay Kha Khaeng Wildlife Sanctuary, Khlong Saeng Wildlife Sanctuary, and Khao Yai National Park with the number of 79, 69, and 68, respectively. The highest species numbers of amphibians were found at Khao Pra-Bang Kram Wildlife Sanctuary (44 species), followed by Namtok Mae Surin National Park (38 species), and Umphang Wildlife Sanctuary (36 species). Considering areas which contain all four groups of mammals, Khao Pra-Bang Kram Wildlife Sanctuary had the highest amount (612 species), and followed by and Khao Yai National Park, Huai Kha Khaeng Wildlife Sanctuary, and Khlong Saeng Wildlife Sanctuary with the 574, 528, 495 species, respectively (Figure 4.11-4.13).



**Figure 4.11** The abundance chart of animal vertebrate species in Thailand, divided into 4 groups: mammals, birds, reptiles, and amphibians (n = 65 protected areas).



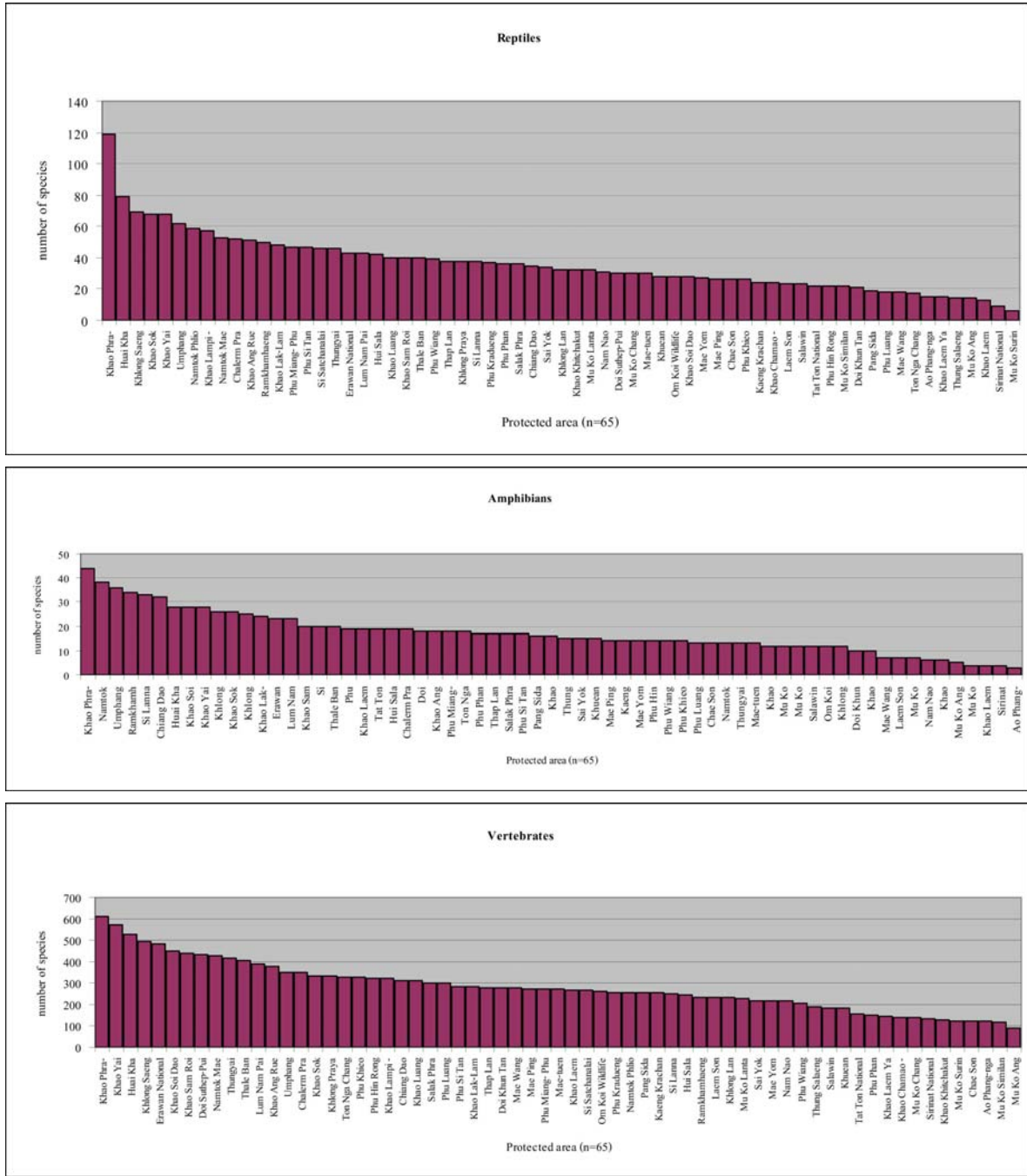


Figure 4.11 (continue)





# Threat to species





**Figure 5.1** The Banteng (*Bos javanicus*) is categorized as Critically Endangered (CR) and is currently in an even more threatened state than the Gaur (*Bos gaurus*) because the Banteng (*Bos javanicus*) forages only in Deciduous Dipterocarp forest and Lower mixed deciduous forest which have been altered for agricultural purposes. The Banteng (*Bos javanicus*) also lives in open forest space and is thus more vulnerable to hunting than the Gaur (*Bos gaurus*). Research done in the Huai Kha Khaeng Wildlife Sanctuary on the tiger's (*Panthera tigris*) diet showed that the Banteng (*Bos javanicus*) is its main prey (Pattanavibool, 2002). (Photo: WCS Thailand)


Thailand is very high in biological diversity, including a large variety of forest and wildlife resources. The country is located in a tropical zone and varies in landscape including the biogeographical regions of the Northern Highland with mountain ridges and wide valleys, the Central Plain of the Chao Phraya River that once was once home to freshwater swamps and monsoon forests but is now almost entirely cultivated as rice paddy fields, and the Southern Peninsula is surrounded by the sea on both sides. However, Thailand's forest has been largely destroyed and remains in patches which is also detrimental to wildlife habitat and indigenous or original plant species within, resulting in their rapid loss or near extinction. Biodiversity loss in Thailand stems from several reasons, both natural and anthropogenic.


## Habitat Change and Destruction


The main cause of forest resource loss is the destruction of wildlife habitat which impacts wildlife survival. Many species die because they are unable to adapt to the altered environment and others are forced to migrate to safety elsewhere (Nabhitabhata and Kongtong, 1993). Habitat destruction can be categorized as follows:

 Mega construction projects such as the building of dams have changed the status of nearby forests into reservoirs and consequently permanently destroying wildlife habitat. For example, the construction of the Rachprapa Dam which destroyed several wildlife species including Storm's stork (*Ciconia stormi*) that is presently under the critically endangered category.

 Forestry concessions which allow for the logging of trees in the past have led to the alteration of wildlife habitat and ultimately wildlife loss as they are unable to survive.

 Loss flat plains and grasslands to agricultural production and human residential areas have led to the extinction of many species from the wild and from the world entirely such as the Schomburgk's deer (*Cervus schomburgki*), which had very beautiful antlers and the extinction of large grass-warbler (*Graminicola bengalensis*) from Thailand.

 Alteration or the loss of wetlands from the filling of wetlands with soil for the construction of buildings. The change of the state of Bung Boraphet wetland has destroyed white-eyed river-martin (*Pseudochelidon sirintarae*) habitat. Also, the destruction or alteration of wetlands and areas with aquatic plants in Pathum Thani province, home to the large grass-warbler (*Graminicola bengalensis*) can now no longer be found in the area.

 Destruction of endemic habitats of wild animals caused by various developments such as the explosion of granite mountains for the cement industry which has destroyed the habitat of the limestone rat (*Niviventer hinpoon*). It is an endemic species and is categorized as an endangered wild animal of Thailand.



### Box 5.1 White-eyed river-martin (*Pseudochelidon sirintarae*)

The white-eyed river-martin (*Pseudochelidon sirintarae*) is categorized as an endemic and new species to the world. It was discovered by Mr. Kitti Thonglongya at Bung Boraphet, Nakhon Sawan Province while carrying out the Migratory Animals Pathological Survey (MAPS) joint project between Asian nations that took place on January 28, 1968. Local community members captured approximately 700 birds and handed them over to the project officials. The majority of the birds were swallows of various kinds but with one particular unique type. On January 29, 1968 another was found. Unfortunately the two birds died after two days of their capture and was then stuffed. In the following month, 8 more of this species were captured. After detailed inspection, the birds were identified as a new species, with its name taken from Her Majesty the Princess Sirindhorn as an honour and tribute to her majesty's love for nature (Khobkhet, 2001). After that, up until present day, there has been no reporting or sighting of the species at all. This is mainly attributed to its habitat destruction from fishing, transformation of the marshland into rice paddies, and the control of water in the marsh for various development projects. These activities have caused tremendous impacts on the survival of aquatic plants and the white-eyed river-martin (*Pseudochelidon sirintarae*) (Thailand Institute of Scientific and Technological Research, 1990).



White-eyed river-martin (*Pseudochelidon sirintarae*)

(Photo: Thailand Institute of Scientific and Technological Research ; Wildlife Fund Thailand)

## Box 5.2 The Explosion of Granite Mountains and The Threat to Species

The granite mountain is often overlooked for its importance to biodiversity but is actually quite high in biological diversity, with more endemic species found than other areas. There's been record of limestone wren-babbler (*Napothera crispifrons*) found and it has been categorized as endangered species. The Neill's rat (*Leopoldamys neilli*) has been categorized as vulnerable and the limestone rat (*Niviventer hinpoon*) as endangered. Both the Neill's rat (*Leopoldamys neilli*) and the limestone rat (*Niviventer hinpoon*) are considered endemic species to Thailand only found on granite mountains. However, the extraction of granite for cement production and road construction has lead to the explosion of 20% of Thailand's granite mountains. The impacts of these activities has destroyed the habitat of these endemic organisms, resulting in their gradual extinction (Anonymous, 2004).



Limestone wren-babbler (*Napothera crispifrons*) - Endangered  
(Photo: Thiti Tanaree)



Limestone rat (*Niviventer hinpoon*)-Endangered and endemic species  
(Photo: Surachit Wangsothon)

## Overexploitation

Wildlife has many benefits and uses to mankind as it is nutritionally a source of protein for consumption, a source of labour, leather for wearing and many more. This has led to the overexploitation of wildlife resources which has rapidly decreased their diversity.

### Box 5.2 Wildlife Trade (past-present)

In 1973, from the warehouse records of Netherlands back when Ayutthaya was capital, Thailand was able to export up to 120,000-160,000 sheets per year of deer hide (could also included Schomburgk deer (*Cervus schomburgki*) and Eld's deer (*Cervus eldii*) hide) per year. In other terms, up to 150,000 deer were killed annually, and could be considered as the average estimate for that time (Yoneo and Toshikawa, 1987 refer to Bhumpakphan, 2005). Presently, Thailand must work to campaign against and rid of poaching. It was found between September 2003 and February 2004 that illegal trade and sale of wild animals had decreased. There was less trade of elephant ivory and ivory products (when compared in monetary terms to other types of products, ivory is still considered highest in value). This situation at the border provinces around Laos, Cambodia and Myanmar is still of concern while the most concern, i.e. where illegal trade is most prevalent lies within Bangkok and the greater Bangkok area (Parimonthol). Around 80.18% (97 million baht) of illegal trade occurs in the Bangkok area, 9.85% (11.9 million baht) in Chon Buri, 0.36% (435,000 baht) in Chiang Mai, 0.10% (117,000 baht) in Surat Thani, and 0.07% (90,000 baht) in Tak province (World Wildlife Fund (WWF) Thailand, 2004).

### Box 5.3 Dangers that threaten wildlife

Animal parts or organs have been used for medical purposes as they are believed to have healing properties such as the bones of tiger (*Panthera tigris*) to cure typhoid and malaria, leopard flesh for the nourishment of the kidney, the genitalia of all types of tigers to cure male impotency and regulate the female menstrual cycle. In addition, there are many other published material that list medicines derived from wild animal organs. These beliefs, which have been proven to be false, are considered as detrimental to the survival of various organisms, especially tigers and in particular the tiger (*Panthera tigris*) which is the most threatened species (Satapanawat and Robinowitz, 1995).

### Box 5.4 Unexpected loss in the United States of America

The passenger pigeon could once be found in flocks of up to 2 billion in the United States of America but is now sadly extinct even though the destruction of its habitat was not critical back then (Owen and Chris, 1995 refer to Bhumpakphan, 2000).

The second example occurred in 1980 when there was immense hunting of the American Bison for recreation which led to the rapid decline of the species from approximately 6million to no more than 10 (Duangkhae, 2004).



## Invasion of Alien Species

Invasive Alien Species (IAS) are considered the second most serious threat to biological diversity next to habitat loss. In some countries it is considered as the most serious threat. The species invade and change the indigenous ecosystem which can lead to the extinction of native species. This often leads to serious environmental, economic, health and social problems.


In the past, IAS issues may have seemed to be of low concern, but it can no longer be ignored as non-indigenous species are heavily introduced into Thailand yearly. For instance the golden apple snail (*Pomacea canaliculata*), native to Latin America, was introduced into Taiwan from Argentina between 1979-1989 for canned and fresh consumption. But it no longer has any economic value and has now become an invasive alien species in Taiwan. Thailand imported the golden apple snail (*Pomacea canaliculata*) into Bangkok in 1989 with the intention of cultivating it for consumption and as ornaments in aquariums to clean up algae. Later it was found to be unprofitable and thus the golden apple snail (*Pomacea canaliculata*) business was dropped, resulting in a release and spread of the golden apple snail (*Pomacea canaliculata*) into natural water sources. It eventually adapted to the surroundings, became an invasive species, and is now hurting Thailand's economy terribly, especially for rice paddies. In addition Thailand introduced the African walking catfish (*Clarias gariepinus*), a native species of Africa, to cultivate for consumption. Later the cultivation pond flooded, releasing some African walking catfish (*Clarias gariepinus*) into natural waters. The African walking catfish (*Clarias gariepinus*) is carnivorous and has thus preyed on native aquatic species and negatively impacted their well-being (Office of Environmental Policy and Planning, 1997 C).


### Box 5.5 Alien species


Alien species refer to organisms which have never existed in one area before that has been introduced from another and has established itself in the new ecosystem, either negatively or positively impacting (or not at all) the new environment.

Invasive Alien Species refer to species that threaten ecosystems, habitats. There are various reasons an alien species can become established and invade its new environment. Humans are the main vectors for alien species introduction and invasion as we have such a large influence over our environment, chemically and physically.

The impacts of invasive alien species include

 *Impacts on the ecosystem:* invasive species may drastically alter a part of the ecosystem they overtake. For instance they may reduce the ecosystem's biodiversity structure by altering the life forms of that ecosystem. Invasive species may increase the biomass, interrupt the dynamics of plant society, change food cycle and the transfer of energy in the system.

 *Impacts on native species:* invasive species may compete with, displace, prey on, or are parasitic to native species. They may also be carriers of diseases.

 *Impacts on genetic diversity:* invasive species may reduce genetic diversity the loss of or reduction in the native ecosystem's dominant population. Gene pool loss, gene complexity, and cross breeding of alien and native species all result in genetic diversity reduction in the ecosystem.




*Impacts on the economy:* the negative impacts of invasive alien species spreads widely through the realm of a nation's economy. Illueca (1996) gives the example of the disappearance of the Atlantic salmon (*Salmo salar*) from 30 streams in Norway caused by parasites and pathogens that were carried by the Baltic salmon; an alien species introduced as pets (Kutintara, 1997)

## Box 5.6 Vertebrate Invasive Alien Species of the World

-  14 types of mammals: Goat (*Capra hircus*) - eats entire plants (shoots, leaves, roots) leaving them unable to grow again; Wapiti (*Cervus elaphus*) - has spread so much in North America that various plant life are unable to grow and support such a large population; Domestic cat (*Felis catus*) - introduced to islands and intently preyed on small organisms; Small Indian mongoose (*Herpestes javanicus*) - introduced a biological control agent to prey on mice around the islands, particularly in countries that grow cane, but end up over preying on other native species such instead; Crab-eating macaque (*Macaca fascicularis*) - are omnivorous and feeds on both plants and animals, deteriorating the surrounding environment; House mouse (*Mus musculus*) - introduced and spread to new areas via ships; Stoat (*Mustela erminea*) - introduced as pets but spread and heavily preyed on native island animals; Coypu (*Myocastor coypus*) : once spread in Thailand; Rabbit (*Oryctolagus cuniculus*) - quickly spread in Australia because it was able to rapidly reproduce; European house rat (*Rattus rattus*) - a mouse that lives in domestic areas; Grey squirrel (*Sciurus carolinensis*) - originally found in America but spread to Europe and were fiercer competitors for space than the native species; Pig (*Sus scrofa*) - eats both plants and animals such as bird eggs, birds, young birds, potatoes causing many islands in Hawaii had to introduce measures to eradicate; Brush-tailed possum (*Trichosurus vulpecula*) - a marsupial that spread on islands in Australia; and the Red fox (*Vulpes vulpes*) can adapt very well to various environments.
-  3 types of birds including: Common myna (*Acridotheres tristis*) originally from India; Red-vented bulbul (*Pycnonotus cafer*) no record in Thailand yet but originally from India and has spread in Florida, USA, an island in Australia and many southern islands. It competes with native species for food; and the European starling (*Sturnus vulgaris*) spread in USA and competes with natives for food.
-  3 types of amphibians including the Giant toad (*Bufo marinus*) introduced to help capture insects that were destroying cane in Australia but ended up feeding on other native species; Caribbean tree frog (*Eleutherodactylus coqui*) lives in the West Indies islands in very large numbers and has competed with other species for insects and other animals; and the Bullfrog (*Rana catesbeiana*) also known as Bullfrog, not yet spread in Thailand.
-  2 types of reptiles: Brown tree snake (*Boiga irregularis*) - preys on birds and their eggs, has invaded various islands via air cargo shipments; and the Red-eared slider (*Trachemys scripta*) "which has spread to Bangkok and the perimeter. It was introduced as pets, however as they mature, they lose their cuteness and pet owners release them into the water.
-  8 types of fish: Walking catfish (*Clarias batrachus*) introduced to Florida, USA as an economic species but got free into the wild and ended up feeding on native fish; Carp (*Cyprinus carpio*) popular as pets around the world, likes the cold water, clouds the water as it plucks aquatic plant roots to eat, and thus has had impacts when escaped into the wild; Western mosquito fish (*Gambusia affinis*) Introduced into Thailand but has not become invasive or spread; Nile perch (*Lates niloticus*) a problem in the African lake as it eats native aquatic organism; Large-mouth bass (*Micropterus salmoides*) a ferocious and carnivorous fish; Rainbow trout (*Oncorhynchus mykiss*) introduced into Thailand but has not spread into the wild; Mozambique mouth-breeder (*Oreochromis mossambicus*) can live in both fresh and brackish waters and competes with native species for food; and the Brown trout (*Salmo trutta*) also known as Brown trout, was originally introduced as pets and released into rivers, presently found in all rivers. It can eat a lot and forages for food, including fish eggs, on river banks, leaving negative impacts on native species.

Source: Nabhitabhata (2002)

### Box 5.7 Non - invasive alien species in Thailand

-  Food crops such as corn (*Zea mays*): originally from the America's, was introduced into Thailand around 1689, then in 1920 the American corn was first planted and was mostly used as feed and oil; *Sorghum bicolor* originally from southern Tanzania, Africa, however no record of when it was first introduced but is mainly also used as feed.
-  Fiber crops such as cotton (*Gossypium* spp.) there are various kinds of cotton such as *Gossypium hirsutum* which is originally from Mexico. Cotton is mainly useful for weaving. The *Broussonetia* spp. is originally found in China, Japan and southeast Asia. The *Broussonetia kazinoki* was introduced into Thailand in 1979 mainly for the production of mulberry paper, parasol making paper, and gift wrapping paper for instance.
-  Cassava root (*Manihot esculenta*) originally found in Central and South America and was introduced to Southeast Asia around 1700-1741 in Java (uncertain for Thailand).
-  Sugar products: Cane (*Saccharum* spp.) originally from New Guini.
-  Vegetable Oil Products: Peanut (*Arachis hypogaea*) naturally found in Brazil and Argentina.
-  Other groups of important crops/vegetables: Rubber (*Hevea brasiliensis*) was first brought into Thailand from the Malay Peninsula in 1899 and grown in Umphoe Kunthung, Trang Province. Presently it is a very important economic agricultural product of Thailand. Several species of fruits from cold climates were brought in such as the Japanese apricot (*Prunus mume*) from Taiwan, the pear (*Pyrus pyrifolia*) from Taiwan and India, the apple (*Malus* sp.) from Israel, the peach (*Prunus persica*) from America and Taiwan, the persimmon (*Diospyros kaki*) from Taiwan, and the plum (*Prunus salicina*) from America.
-  Non-native species introduced as biological control agents to control weeds such as the introduction of waterhyacinth weevil (*Neochetina eichhorniae*) from Florida, USA, to control the water hyacinth in 1977. The introduction of mimosa seed weevil (*Acanthoscelides puniceus* and *Acanthoscelides quadridentatus*) from Mexico for the control of the giant mimosa in 1983 and the introduction of *Trichogramma* spp. from China for the control of stem borers that is currently destroying cane tree trunks.

Source: (Iamsupasit, 2002)

## Spread of Disease

In the case where animals are released into the wild from other areas, disease may be brought into the wildlife via these introduced animals as they may be carriers of pathogens, such as the spread of the avian flu or SARS.

### Box 5.8 SARS (Severe Acute Respiratory Syndrome)

Sever Acute Respiratory Syndrome, or SARS, was first spread in Guangdong of China, around the end of 2002 when a patient with Atypical Pneumonia was found who was unresponsive to vaccination. Later there was a spread of Atypical Pneumonia in Vietnam, Hong Kong, Singapore and Canada. From epdermiology investigations it could be correlated that the disease originated from a doctor who was treating a patient in Guangdong who traveled to Hong Kong with a fever. The patient then stayed at a hotel before being admitted into the hospital where many other hotel guests caught the disease and carried it with them back to their home countries or following destinations. On May 9, 2003 it was reported that the disease had spread to 33 countries with 7,183 people infected and 514 dad. The sickness came from a new virus strand, the Corona virus (Bureau of Epdermiology, 2003). The SARS virus originated from the Viverridae family and was spread to humans via the people in direct contact with the said animals that were caught for consumption in China (Manopawitr, 2004). The symptoms vary from patient to patient but generally include fever and respiratory difficulties. The group of people most at risk to infection are those in closest contact with already sick patients. The easiest way to contract the disease is through droplet infection and close contact with the sick (Bureau of Epdermiology, 2003).

### Box 5.9 Avian flu (Bird flu)

The avian flu is a disease contracted from Type A Flu from the Orthomyxoviridae family, which can be caught in both humans and animals such as horse, pigs, cats, birds and chickens. Infection in animals, especially avian species occurred randomly in various countries including England, Canada, Australia, United States of America, Mexico, and Italy. Normally, the transfer of the avian flu to humans is not easy. Those that end up sick have usually come in direct or close contact with infected surroundings and may show serious symptoms, even result in death. The first incidence of a human who contracted the disease was reported in Hong Kong in 1997. Eighteen people were reported sick and 6 as dead. In a separate investigation, the H7N1 strand was found in 2003 in the Netherlands and 83 were reported ill with 1 dead. The H7N7 virus was detected in another separate case. Between those two incidences, the avian flu was also discovered in avian species in the nearby areas. Since 2002, the avian flu had spread to more and more animals in America, Chile, China, Hong Kong, The Netherlands, Germay and Belgium. At the end of 2003-2004 there was a major avian flu epidemic in Asia: Indonesia, Vietnam, Thailand, Taiwan, Cambodia, Japan, The People's Democratic Republic of Lao, Pakistan, Hong Kong and China (Bureau of Epdermiology, 2004).

With the spread of the avian flu in Thailand, it was found that from November 2003 to January 2004 there were many deaths of chickens in several provinces, including the Central region such as Nakhorn Sawan Province. At the same time, the Livestock Development, Ministry of Agriculture and Cooperatives stated that the cause of death was due to cholera in chickens: *Pasturella multocida*. Shortly after on January 23, 2004, the National Institute of Animal Health, Department of Livestock Development (DLD), discovered the H5 virus for the first time on a chicken farm in Suphan Buri Province. This resulted in DLD's serious measures for the prevention and spread of the bird flu in Thailand. In 2004 the bird flu had spread to tiger (*Panthera tigris*)

### Box 5.9 (continue)

that was kept in a zoo in Chon Buri, resulting in the death of many tigers (*Panthera tigris*). Incidences of human infections from animals were reported and many had died from contracting the H5N1 virus. The latest occurrence of the bird flu was in a chicken farm in a central region province in October 2005. This resulted in a major slaughter of birds, particularly chickens and ducks. Furthermore, this incident had caused a lot of fear in the public and led to the killing of many birds that resided in domestic areas (Bureau of Epidemiology, 2004). The Department of National Parks (DNP) was able to find the H5N1 strand occurring in wild birds (February 4 - April 30, 2004) in Bangkok, Pathum Thani, Nakhon Pathom, Nakhon Sawan, Suphan Buri, Ayutthaya, and Ang Thong. Through random sampling of 320 birds (113 dead, 207 alive), with 9 types of birds, the virus was found in 23 birds (12 dead, 11 alive) in only one type of bird: the Asian openbill (*Anastomus oscitans*) (Niyomwan and Kanchanasaka, 2003).

### Environmental Pollution

As humans do, wildlife needs a clean environment to survive. However environmental pollution is increasingly getting worse and gravely impacting wildlife survival. For instance, air pollution caused by soot being released from factory smoke and traffic congestion, water pollution due to oil slick from boats, decay in the water that negatively impacts aquatic life, oil spills which not only impacts aquatic life but sea birds, and also the problem of chemicals from agricultural runoff. Fertilizers, pesticides and insecticides all have a profound effect on the ecosystem. For example, the use of slow release or secondary generation rat poison, especially brodifacoum (Klerat) leads to the death of the barn owl (*Tyto alba*), currently categorized as near threatened, the collared scops-owl (*Otus lempiji*), the Asian barred owl (*Glaucidium cuculoides*), crested goshawk (*Accipiter trivirgatus*), and the crested serpent-eagle (*Spilornis cheela*) as the chemicals accumulate in these birds after eating these mice (Hamarit, 2001).

### Limitations of wildlife that make them vulnerable to threat

Each type of wildlife possesses different behavioral patterns and abilities that help them adapt to their changing environments. Animals that live in natural areas of limited space either need specific types of habitats and food or small areas with large quantities of food and low biological capacity available. The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) is one such animal and is categorized as extinct in the wild. Its gestation period lasts as long as 210-240 days, while the wild elephant (*Elephas maximus*), categorized as endangered, gestates for up to 18-22 months and only gives birth to only one offspring (Duengkae, 1998 B). Further, the wild elephant (*Elephas maximus*) does not adapt well to new or changing environments and is also highly sought out by humans for various uses, resulting in its extremely vulnerable nature to dangers and threats.





**Figure 5.2** The red-headed vulture (*Sarcogyps calvus*) is categorized as Critically Endangered (CR) and was in the past found in the Huai Kha Khaeng wildlife sanctuary, Uthai Thani province and within in the Thung Yai Naraesuan wildlife sanctuary of Kanchanaburi province. Sometimes, hunters will spread poison onto dead deer in order to kill the tigers that prey on them without having to shoot them and thus ruin their hide for sale. Villagers will also leave poison traps for pests such as rats or dogs. However, the red-headed vulture (*Sarcogyps calvus*) will feed on the poisoned dead animals instead, causing the very last flock of the red-headed vulture (*Sarcogyps calvus*) to have disappeared from Thailand (Pattapong, 1996). (Photo: Pongsakorn Pattapong)

## Climate Change

Climate change brings about great physical and biological impacts in the environment on various levels. It impacts the growth, seed production, and reproduction of plants, which in turn can affect animal and human survival which highly depend on this primary production.

The El Nino is a phenomenon caused by the retraction of the warm ocean surface currents during a certain period at the equator in the East Pacific which replaces the cold currents from the West Pacific. Around the northwest of the South America, the water surface temperature increases, causing the world climate to also be affected; from the south of

United States, to Peru, the western Pacific coastal areas, Australia and the countries in South Asia. The El Nino has an affect to all living things on Earth (Ngermool, 2002). For instance, climate change causes change in the hurricanes that bring moisture to the western Pacific and leads to droughts and ensuing forest fires in Indonesia. The phenomenon also affects marine species as the currents change direction and bring about warmer temperatures. The changing air temperatures and quantities of rain also leads to the problem of coral bleaching in many areas across the world. Another important effect is the increase of insects and pests that are harmful to the agricultural industry and are carriers of various disease.



One effect of El Nino on the Thai environment shows where the cold and warm fronts meet at the equator has moved further north than usual. The rains that result from this front thus no longer fall on the countries in Southeast Asia. The monsoon winds from the ocean also

lose their moisture, turning to dry winds that no longer bring rain deep into the mainland, and finally influencing further drought, forest fires, air pollution and disease spread which in turn affect agriculture, economy, Thai society (Ngermool, 2002).

### Box 5.10 Possible extinction of animals due to global warming

The UK's Department of Environment Food and Rural Affairs : Defra, led by British Trust for Ornithology reported on their research on the effects of climate change at the Conservation of Europe union summit (EU) in Scotland and found the following:

- 🐉 Serious impacts on the reproduction of the albatross.
- 🐉 It is expected that within this century the sea level will rise and destroy turtle egg nesting areas. For example 1 in every 3 coastal areas of the Caribbean where sea turtles come nest have been destroyed after high tide. Sea lions and will also lose their habitats.
- 🐉 The warming of ocean waters will result in an increase in females of some sea turtles species as the warm water will directly affect sex determination of turtle eggs.
- 🐉 Drought in many areas will have a long term affect on wetlands and will thus the many water fowl that migrate to these wetlands will.
- 🐉 The expansion of the Sahara Dessert will not only trouble human travelers but also the swallows that will no longer be able to stop in healthy dessert areas for rest Source: BBC News (2005).

### Other causes

The earthquake of December 26, 2004, according to the USGS report, was of 9.0 on the Richter Scale (momentum magnitude) and occurred at 28.6 km depth in the ocean west of the north of Sumatra island, Indonesia. The major eruptions caused giant wives and a tsunami hit the coast of many countries nearby including Indonesia, Sri Lanka, India, Thailand, Malaysia, The Maldives, Burma, Tanzania, Bangladesh, and Kenya. Over 230,000 people died and tens of thousands missing. Within the city of Banda Aceh in Indonesia alone, there were over 150,000 deaths. The 6 Andaman coastal provinces in Thailand which were hit by the tsunami were Ranong, Phangnga, Krabi, Phuket, Trang, and Satun, with a total of 5,395 deaths and over 2,000 missing including both Thai's and foreigners. Over 475,000 Rai of coastal area was affected (Kusuwan, 2005).

### Box 5.11 Tsunami

The word tsunami is worldly accepted as referring to a giant wave of over 100 km in length that causes great hazards to human life and infrastructure. It is originally a Japanese word and if directly translated, means pier, and Tsunami means wave. Tsunamis are generally caused movement in the vertical of ocean floor. The resulting waves often are small and undetectable in open ocean. As the waves approach the coast, it increases in height by several folds, depending on the geography of the coastal area, causing serious damage especially to V-shaped coasts that open directly to the ocean (Kusuwan, 2005).

The giant tsunami wave had great impacts on several types of rare marine animals. Over 37 sea turtles (6 dead), 3 dolphins (2 dead), and 2 dugongs (1 dead) were found beached on the coast and up inland as far as 2 km. The tsunami also washed the sea turtles from the Phuket Marine Biological Center (13 adult of olive ridley sea turtles and 7 juvenile of hawksbill sea turtles) Hard Tary Mueng-Lum Pee national park (3 olive ridley sea turtles, 6 green sea turtles, and 2 hawksbill sea turtles) Aseagoing vessel 3 (more than 1,000 juveniles sea turtles, and 8 sea turtles (including green sea turtles and hawksbill sea turtle) and Marine Research Center, Ranong province, Kasetsart university (4 hawksbill sea turtles, and 10 olive ridley sea turtles) to missing into the sea. From an analysis of damaged coral reef along the Andaman coast (78 km), it was found that 36 km<sup>2</sup> were damaged (or 22,500 rai). Within this amount, of the area with great damage (where 50% of live coral was ruined) approximately 7.8 km (or 4,875 rai) and from the spot check of sea grass (which covered 36,027 rai or about 72% of Andaman sea grass area), it was found that sea grass received 5% damage. Furthermore, 1.5% of the sea grass area surveyed was eroded and missing (Phuket Marine Biological Center, 2005).

### Box 12 Unintentional threat to species

Thai people often release birds and fish into the wild as part of their religious ceremonies and customs in belief that it creates good karma. However, many do not realize that these good intentions actually further cause the hunting of various munias (*Lonchura* spp.), Malayan snail-eating turtle (*Malayemys subtrijuga*), and the black pond turtle (*Siebenrockiella crassicollis*). *Is this good or bad karma?*



(Photo: Advanced Thailand Geographic magazine)

# Socio-economics versus Threat

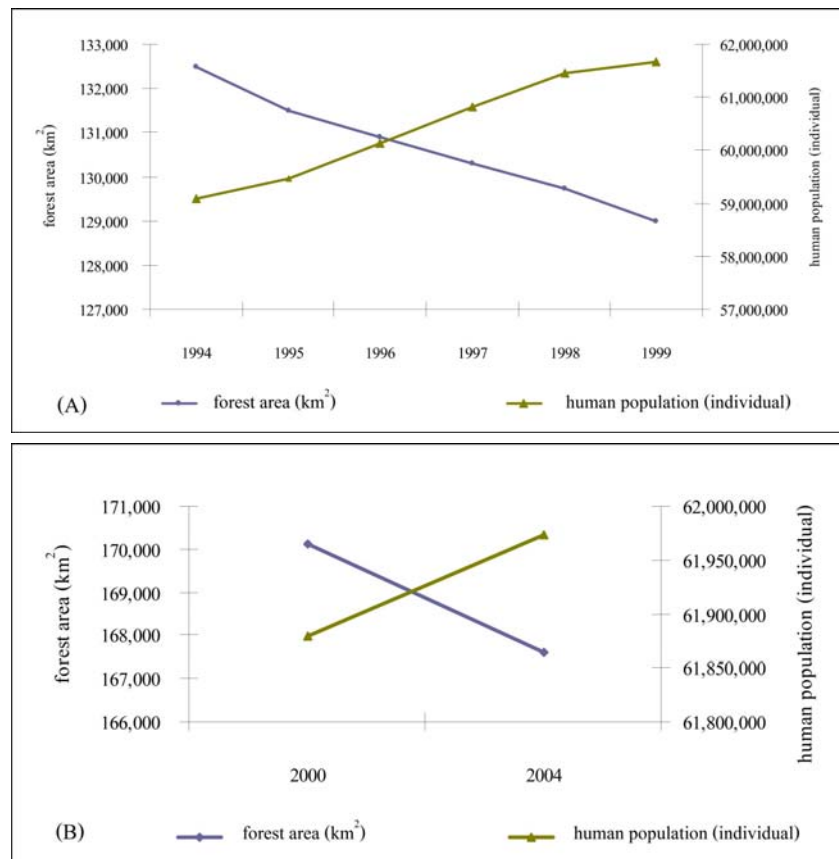


**Figure 6.1** The Mekong giant catfish (*Pangasianodon gigas*) is classified under the critically endangered (CR) status and can mostly be found in the Mekong river and its branches in depths of over 10 meters where there are gravel beds or caves for them to hide. However, almost 100 mature individuals will be caught yearly, and sold as food at high prices in the market, leading to their population decline in the Mekong River each year (Thailand Institute of Scientific and Technological Research, 1990). (Photo: Chavalit Vidthayanon).

Although most believe natural resources such as plants and wildlife are renewable, they do not realize that their overexploitation can lead to their extinction. Nowadays, particularly with the rapid increase in human population, the utilization of natural resources for consumption and goods production for the development of a country's economy has increased at an alarming rate. These reasons influenced to the destruction of natural forest resources including habitats and wildlife population, and finally lots of wildlife were defined as threaten status. Forest resources and habitats have been largely destroyed as a consequence, resulting in the threatened status of several wildlife species.

## Population

In 2004, the population of Thailand was recorded at approximately 62 million people with an average population density of 121 people/km<sup>2</sup> (Figure 6.2). This figure has increased rapidly in the span of 10 years when the population was 59 million in 1994. This rapid increase in human population has led to a decline in forest resources and wildlife as illegal hunting and logging have also increased, and as a result, destroying feeding and breeding places of wildlife.



**Figure 6.2** Changes of forest areas versus human population in Thailand during 1994 to 2004

**Sources:** human population: <http://www.dopa.go.th/> (2005)

Forest areas from 1994-1999: [http://www.forest.go.th/stat/stat\\_th.htm](http://www.forest.go.th/stat/stat_th.htm) (2005)

Forest areas from 2000-2004: National Park, Wildlife and Plant Conservation Department (2004 A)

**Remarks:** Figure A; Forest areas in the scale of 1 : 250,000

Figure B; Forest areas in the scale of 1 : 50,000

Human population decreased in 2004 due to the revision of registry people the whole kingdom, especially in cases of replicated and over listed name.

Despite Thailand's numerous laws, measures, policies, population decline of organisms has not been slowed. Instead, stakeholders must





work together to strictly obey protective measures in the conservation of natural resources.

### Box 6.1 United Nations (UN) points finger at humans for destroying the world and sets up the target to restore biodiversity in the next 5 years




The report of "The evaluation of Ecosystems in the 2<sup>nd</sup> millennium" by the UN requested governments, NGOs, international institutes, and private companies of the world to cooperate in the creation of a long-term plan to protect biodiversity, especially because during the past half century, humans have destroyed the environment like never before. This report was completed by 1,300 researchers who had been collecting environmental, ecological and biodiversity data all over the world since 2001. It was found that human activities over the past few decades have contributed to more than 20% loss of mangrove forests, and have put over 25% of forests and 35% of amphibians at risk of extinction (Khaosod, 2005).

### Box 6.2 Wildlife trade

Wildlife trading situation in Thailand



-  The main place for trade of both domestic and international species of birds and reptiles is at markets within Bangkok.
-  The border markets are the main trading places to import and export tiger bones and skins and antlers/horns.
-  Places that sell traditional medicine consisting of animal parts that are usually imported from neighbouring countries can often be found within the Chinese communities of Bangkok.
-  The biggest source of illegal ivory trade is tourists who illegally sneak back products to their home countries.

#### **Five objectives of wildlife trade in Asia**

-  For consumption: in the local regions, the wildlife targeted hunting include common barking deer, sambar, langurs, gibbons, porcupines, civets, pheasants, and reptiles and amphibians such as freshwater turtles, snakes, and frogs. Rare species are consumed by the richer people, including tiger meat and bear's gall.
-  For decoration: some wildlife organ parts are used for decoration such as sculptured ivory tusks, tiger skins (tiger (*Panthera tigris*), leopards (*Panthera pardus*), clouded leopard (*Neofelis nebulosa*), Asian golden cat (*Profelis temminckii*), Eld's deer (*Cervus eldii*) antlers, horns of gaur (*Bos gaurus*), banteng (*Bos javanicus*), wild water buffalo (*Bubalus bubalis*), rhinoceroses, carapace of marine turtles, snake skins, and insect specimens as butterflies, and some beetles.
-  For domestication: Rare species are often coveted by certain groups of collectors and traded at very high prices. Targeted animals include wild birds with beautiful feathers or song birds such as the straw-headed bulbul (*Pycnonotus zeylanicus*), hill myna (*Gracula religiosa*), Asian fairy-bluebird (*Irena puella*), silver-eared mesia (*Leiothrix argentauris*), barbets (*Megalaima* spp.), and parrots of Australia and South America. In addition, unique reptiles such as the chameleon of Madagascar, lizards of the Amazon, snakes of New Guinea, and small freshwater turtles are also in high demand.



**Box 6.2 (countinue)**

-  In traditional medicine: Traditional South East Asian medicines incorporate thousands of herbs as well as animal parts including rhino horn, tiger bone, tiger canine teeth, tiger's eye, and bear gall. Some groups believe that to consumption of certain organs will help with sexual improvement such as the tiger's penis and snake's gall.
-  For zoo activities of government or private sectors: Zoos in South East Asia often trade in large quantities of wildlife but however lack measures to properly control, handle, and care for the animals, or the appropriate facilities, resulting in a high mortality rate. Due to the rapid increase in the number of private zoos, rare species have become high in demand, from small animals to large animals as elephants or those that can not propagate easily like orangutans, gorillas, cranes, hornbills, and large water fowl (Manopawitr, 2004).

**Economy**

The present economic situation in Thailand can be considered as high in terms of growth. Unfortunately, only those with enough investment capital to support and manage big projects are reaping the benefits of this economic growth. The general public however, especially farmers are not benefiting from these gains as most of them are in debt from loans taken to invest in their production. One way to help relieve their debt is by investing in capita that requires no pay back or interests,

such as the sustainable use and conservation of local natural resources. Conserved areas are abundant in other resources that can used as sustenance. Their impacts through their use of natural resources are however still less harmful than the capitalists who only look to gain without considering future effects.

Both economic development and high population growth result in the overexploitation and utilization of natural resources that is beyond nature's carrying capacity. Without effective management, increased natural resource depletion is unavoidable.

**Box 6.3 Sustainable development of the industrial enterprise**

Economic expansion in Thailand has resulted in increased domestic and foreign investment, according to statistics that show an increasing number of newly established industries and the amount of invested capital that has risen during the past 5-6 years. This has definitely impacted the environment in Thailand. However, solutions often focus on monitoring of environmental effects in the surrounding areas, and the development of new technologies for treating industrial wastes. These methods add to capital costs and unsustainable development of industries in Thailand. The sustainable development of the industrial enterprise should consider a balance between economic growth and protection of ecosystems, paying particular attention to increased efficiency in resource use and pollution reduction. This balance principle is applied in the "Eco-Efficiency" theory which talks about the high competition between the efficiency in production and management, with the aim to satisfy human needs and improving quality of life, while considering impacts on ecosystems and natural resources and the Earth's carrying capacity. Eco-efficiency also aims at reducing consumption of natural resources and adding value to products and services so that consumers can gain the highest benefits with the least effects on the environment (Jamondusit, n.d.).

# *The Conservation and Protection of Thai Species*








**Figure 7.1** The false gaviel (*Tomistoma schlegelii*), categorized as Extinct in the Wild (EW), lives in the rivers, and can sometimes be found in brackish water areas. Intense hunting pressures coupled with a required long gestation period left the false gaviel as easy targets for predators and can thus no longer be found in the wild (Thailand Institute of Scientific and Technological Research, 1990). (Photo: Tanya Chan-ard)

Conservation management aims to protect forest resources and wildlife so as they may last sustainably and is supported by Thai laws that promote conservation work. Thailand still requires a lot of serious effort in order to accomplish this goal particularly in the areas of education, research, use of news media, creation of measures, policies and plans, as well as the cooperation between government, private agencies and the community.

## Research

There is a lot of research on wildlife resources in Thailand being done by various agencies including The Department of National Parks, Royal Forest Department, Department of Fisheries, several universities, and even some private agencies. Despite all this work done, there are a great number of organisms whose biology and ecology remain unstudied. According to the assessment of wildlife completed by the Office of Natural Resources and Environmental Policy and Planning in 2005, at least 179 species were categorized as data deficient. Of these 7% were mammals, 5% birds, 51% reptiles, 20% amphibians and 17% fish. These species should be given highest priority for future research needed in Thailand:

-  Mammals such as the black-striped squirrel (*Callosciurus nigrovittatus*), the European weasel (*Mustela nivalis*), pygmy shrew (*Suncus malayanus*), and the Malayan tail-less leaf-nosed bat (*Coelops robinsoni*)
-  Birds such as great crested tern (*Sterna bergii*), Bonelli's eagle (*Hieraaetus fasciatus*), clamorous reed-warbler (*Acrocephalus stentoreus*), Deignan's babbler (*Stachyris rodolpheii*), and Mekong Wagtail (*Motacilla samveasinae*)
-  Reptiles such as the logger-head sea turtle (*Caretta caretta*), Somsak's snake skink (*Dibamus somsaki*), Phuket gecko (*Cnemaspis phuketensis*), Horsfield's parachute gecko (*Ptychozoon horsfieldi*), and Siamese blind snake (*Typhlops siamensis*)
-  Amphibians such as Malayan caecilian (*Caudacaecilia asplenia*), Koh Toa caecilian (*Ichthyophis kohtaoensis*), Boulenger's chorus frog (*Microhyla annectens*), Doi Chang frog (*Chaparana aenea*), and Boulenger's tree frog (*Rhacophorus verrucosus*)
-  Fish such as the *Aetomylaeus maculatus*, *Amblypharyngodon chulabhornae*, *Syngnathus spicifer*, *Pterois antennata*, and *Chaetodon bennetti*

### Box 7.1 Examples of biodiversity related research and projects

-  Wildlife Conservation Society of Thailand (WCS) ([www.wcsthailand.org](http://www.wcsthailand.org), 2005)
  -  Conservation of agile gibbon (*Hylobates agilis*) and siamang (*Symphalangus syndactylus*) in the Hala Bala Forest Complex, Southern Thailand
  -  Building Monitoring System for Tiger Conservation in Western Forest Complex, Thailand
  -  Asian Elephant Surveys and Human-Elephant Conflict Mitigation in Kaeng Krachan National Park, Thailand
-  Wildlife Research Division, Wildlife Conservation Office (Changtragoon, 2004)
  -  The density and distribution of the population of animals that eat large plants in the Khao Nang Rom, Huai Kha Khaeng Wildlife Sanctuary area, Uthai Thani province.
  -  The distribution and use of habitat of the marbled cat (*Pardofelis marmorata*) in Thailand
  -  The ecological niche and distribution of the Siamese crocodile (*Crocodylus siamensis*) in Thailand
  -  Monitoring wild elephant population change in the Khao Ang Rue Nai Wildlife Sanctuary
  -  Biodiversity study in Dao Chiang Dao, Chiang Mai
  -  The spread, distribution, abundance, and population of rare and endangered large mammals
  -  The study of the state and distribution of water fowl in Thai wetlands
-  Research by government, private, and many other agencies



## The exchange of news

The Office of Natural Resources Policy and Planning aims to educate the public and raise awareness on the importance of wildlife and forest resources conservation through a strategy to disseminate news called the Clearing-House Mechanism (CHM). The CHM website publishes gathered biodiversity information and reports progress on the Convention on Biological Diversity (CBD) and the Ramsar Convention on Wetlands of International Importance as Waterfowl Habitat, and is available at <http://chm-thai.onep.go.th>. Biological safety information can be found at <http://bch-thai.onep.go.th>. ONEP also distributes published documents such as the book on Amphibians and Reptiles in Thailand, Fishes in Thailand, Birds in Bung Boraphet, Peat Swamp Fishes of Thailand, Algae in Thailand and Bryophytes in Thailand, etc. In addition, the National Park, Wildlife and Plants Conservation Department (DNP) has organized exhibitions to spread knowledge on forest resources and wildlife within protected areas. DNP has also made December 26<sup>th</sup> of every year National Wildlife Day

Several agencies have tried to build the capacity of their officials through training workshops that emphasize skill development in the areas of field surveying, analysis, and database management.

## National Policy and Plans

- 🌿 Cabinet Policy of December 11, 1996 called for Thailand to increase in its international relations at all levels and further cooperate with various countries and international organizations to solve global, national and regional environmental problems.
- 🌿 Cabinet Policy of December 26, 2001 called for the restoration of biodiversity quality and the prevention of and protection from biodiversity decay to promote community well-being and sustainable development. This is to be done through the support of research and development of technology to increase capacity in conservation, restoration, and natural resource use.

The screenshot shows the CHM website interface. At the top, there is a banner with the text "กลไกการเผยแพร่ข้อมูลข่าวสาร ความหลากหลายทางชีวภาพ" (Information Dissemination Mechanism for Biodiversity). Below the banner is a Google search bar and navigation buttons for Thai, English, Download, and Home. The main content area is titled "ข่าวประชาสัมพันธ์และประกาศ" (Public Relations and Announcements) and lists several events:

- โครงการเผยแพร่ข้อมูลข่าวสารของประเทศไทย**: ส่งเสริมและเอื้ออำนวยความร่วมมือทางวิชาการและวิทยาศาสตร์ ทั้งในประเทศและระหว่างประเทศ
- โครงการเผยแพร่ข้อมูลข่าวสารความหลากหลายทางชีวภาพ**: จัดทำพัฒนาการระดับโลกสำหรับการสนทนาและแลกเปลี่ยนข้อมูลข่าวสาร ด้านความหลากหลายทางชีวภาพ
- ข่าวประชาสัมพันธ์และประกาศ**:
  - การอบรมโครงการกลไกการเผยแพร่ข้อมูลข่าวสารความหลากหลายทางชีวภาพ และข้อมูลข่าวสารความปลอดภัยทางชีวภาพ ณ ห้องประชุม Fortrop ชั้น 3 และห้องคอมพิวเตอร์ 60 บี ชั้น 2 ตึกวิทยาศาสตร์ คณะวนศาสตร์ มหาวิทยาลัยเกษตรศาสตร์ ระหว่างวันที่ 29 - 31 ส.ค. 2549 เวลา 09.00 - 16.30 น.
  - การอบรมการจัดระบบฐานข้อมูลความหลากหลายทางชีวภาพ ณ คณะวนศาสตร์ มหาวิทยาลัยเกษตรศาสตร์ ระหว่างวันที่ 23 - 24 ส.ค. 2549 เวลา 09.00 - 16.30 น.
  - การประชุมการจัดเงินงานตามกลยุทธ์ทั่วโลกด้วยกรณีศึกษา ณ ห้องมิราเคิล แกรนด์ เอ ชั้น 4 โรงแรมมิราเคิล แกรนด์ คอนเวนชั่น วันที่ 8 ส.ค. 2549 เวลา 09.00 - 16.30 น. (Download 1 | 2) (update 26/07/49)
  - การประชุมคณะทำงานที่ปรึกษาและกำกับโครงการจัดการอบรมแห่งชาติ ครั้งที่ 7/2549 ณ ห้องประชุม 2

On the right side, there are several promotional banners, including one for "Protect Biodiversity in International Day for Biological Diversity" and another for "Thailand: Partnership for Development".



### National Socioeconomic Development Plan

- The National Socioeconomic Development Plan, 8<sup>th</sup> edition, 1997-2001: Set the goal for the development of natural resources management in the form of community forests for conservation and improvement of community well-being. Increased opportunity was presented for community members to participate in the planning natural resources. The national policy also supported laws which were in favour of villagers and small-time fishermen.
- National Socio-Economic Plan, 9<sup>th</sup> Edition, 2002-2006: Goal to conserve and restore 25% of the country's natural resources by setting up information networks and providing funding in biodiversity research in order to help restore ecosystem balance. Regulations were also to be set up for the protection important plant and animal species, as well as the participation of local communities in biodiversity conservation and protection.
- National policy and plan to enhance the quality of the environment 1997-2016: Calls for the sustainable use of natural resources, the rapid restoration of disturbed natural resources - especially forest and coastal resources - and the improvement of laws and regulations for the sound management of natural resources. Education and research is also supported along with the building of environmental consciousness. All of this is in conjunction to the terms of the Convention on Biological Diversity which requires principles of sustainable development, habitat conservation, and the promotion of education and research.



Policy, measures and plans for the conservation and sustainable use of natural resources, 1998-2002 and 2003-2007: Each edition is made up of 7 strategies and several objectives and activities that streamline with the

Convention on Biological Diversity.

These two sets of policies, measures and plans were approved by Cabinet on January 15, 1997 and June 11, 2002 respectively, and were implemented by the relevant agencies including the Office of Natural Resources and Environmental Policy and Planning, The Department of National Parks, Royal Forest Department, Department of Livestock Development, Department of Fisheries, Department of Agriculture, Department of Department of Medical Sciences, etc. Funding was provided by these respective agencies.




The Administration of state affairs 2003-2004 Strategy 4 : Policy to manage natural resources and the environment so as to create balance in its conservation and use for the purposes of sustainable development. The policy has a target to set 25% of forest land and at least 1.5 million rai of mangrove land in Thailand as conservation areas. Controls have been set that regulate the use and profit sharing of these natural resources as well as the research and development of biodiversity information database and research development for potentiality of commercial.



National plan for the conservation of wildlife resources (2005-2014) which has the purpose of establishing an effective wildlife resource management system in Thailand for the: 1. protection and restoration of wildlife; 2. protection and revival of natural wildlife habitat areas; 3. educate, research and promote knowledge on the protection of wildlife; 4. cultivation of rare and endangered wildlife (including economical species); 5. benefit sharing between the public from all sectors; and 6. the maximization of public participation in the management of wildlife resources for the sustainable development of Thailand (National Park, Wildlife and Plants Conservation Department, 2004 B)




## Box 7.2 Policies, measures, and plans for the conservation and sustainable use of biological diversity

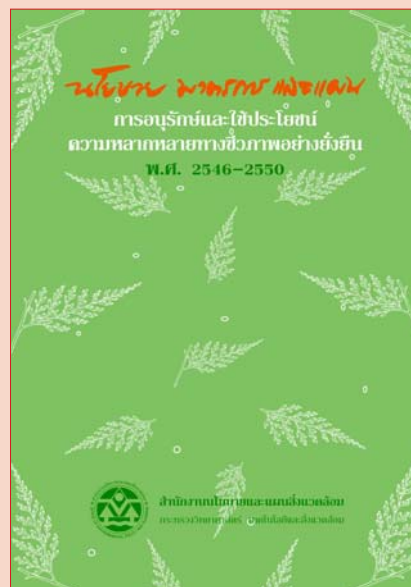
 **Policies, measures, and plans for the conservation and sustainable use of biological diversity (Office of Natural Resources and Environmental Policy and Planning, 1998-2002** (Office of Environmental Policy and Planning, 1997 A)

- Strategy 1 Enhance the capacity of organizations and personnel in the conservation of biodiversity
- Strategy 2 Enhance the capacity of protected areas to ensure the sustainable protection of biodiversity
- Strategy 3 Enhance the motivation in the conservation of local biodiversity
- Strategy 4 Conservation of species, population and genetic diversity
- Strategy 5 Control and monitor processes and activities that threaten biodiversity
- Strategy 6 Promote biodiversity, environmental and cultural and traditional management
- Strategy 7 Promote cooperation between national and international agencies and institutions for the conservation and sustainable use of biodiversity



 **Policies, measures and plans for the conservation and sustainable use of biological diversity, 2003-2007** (Office of Environmental Policy and Planning, 2002)

- Strategy 1 Heighten public knowledge, understanding, and awareness of the importance and value of biodiversity
- Strategy 2 Build the capacity and expertise of organizations, agencies, and personnel in the conservation of biodiversity
- Strategy 3 Enhance the conservation, restoration, and protection of ecosystems and natural habitats within and outside of protected areas
- Strategy 4 Enhance the quality of species and genetic diversity protection and their sustainable use
- Strategy 6 Build the motivation and support the participation of the public in the conservation of biodiversity so that it parallels with Thai customs and tradition
- Strategy 7 Enhance and develop international cooperation in the conservation and sustainable use of biodiversity



### Box 7.3 National Plan for the Conservation and Wildlife Resources (2005-2014)

#### Strategies and Plans

- Strategy 1* Study, research, and gather information on the creation of a wildlife and ecosystem database; Develop a systematic research plan on wildlife; Technological development for the study of wildlife and wildlife products; Develop a database and information; Build cooperation between involved national and international government and private agencies in the research wildlife and wildlife habitat.
- Strategy 2* Integrated conservation management which involved: the adjustment of the structure of agencies that are responsible for the management of wildlife; personnel capacity development; the enhancement of national and international cooperation; the improvement of laws and regulations including the integrated and master plans
- Strategy 3* The conservation of ecological and wildlife resource diversity: management and restoration of the natural balance of wildlife resources and their habitats; ex-situ conservation of endangered species; using ecosystem management for the set up of conservation areas; dissemination of knowledge to the public on ecology and wildlife
- Strategy 4* The sustainable use of wildlife resources involving the *ex-situ* and *in-situ* management of wildlife outside of protected areas. This includes the education and recreational use of wildlife with public participation

(Source: National Park, Wildlife and Plants Conservation Department, 2004 B)



Master Plan for Forest Development (draft paper) (BE ...) with the purpose to stop the destruction of natural forests that are habitats of wildlife, plants and biological diversity. There are also plans to protect and conserve forest resources for the conservation of ecosystems and biodiversity; plans for the management of forests by rural communities under government support; and plans for urban forestry.


### Acts for the Conservation of Wildlife Resources


The first law written concerning wildlife conservation was in the year 1900 with the Wild Elephant Protection Act 1921, which was replaced by another in 1941. In the years that followed other acts were put in place: The Forestry Act, 1941, amended in 1989; The


Fisheries Act, 1947; and another Wild Elephant Act (2<sup>nd</sup> edition) in 1960. However, serious protection of wildlife only began after the Wildlife Preservation and Protection Act, 1960. In the following year, the National Parks Act, 1961 was enacted and can also be considered as preserving and protection wildlife and wildlife habitat. The public however still shared parts of these areas for recreational purposes which contributed to raising their consciousness for the conservation of natural resources. In 1992, the 1960 Wildlife Preservation and Protection Act was amended and has become critical to present wildlife protection efforts. It specified wildlife sanctuaries for the protection of wildlife and their natural habitats, as well as identified wildlife species to be preserved or protected in accordance to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which controls the import and export of endangered wildlife and wild

plants. The Wildlife Preservation and Protection act of 1992 was again amended in 2003 with the addition of more species of wildlife to be protected, and allowed for the legal cultivation of protected wildlife.


## Wildlife Conservation Related Conventions


- 

Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971-Ramsar Convention: The purpose of this convention is the conservation and wise use of wetlands as well the protection of wetlands as habitats of waterfowl (Thailand was the 110<sup>th</sup> nation to ratify on September 13, 1998).
- 

Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972: The goal of this convention is to strengthen cooperation in the specification of appropriate measures for the continued preservation, protection and enhancement of cultural and natural inheritance. (Thailand ratified on June 16, 1987).
- 

Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973-(CITES) : The goal of CITES is to conserve and protect wildlife and wild plant species that are threatened or endangered from international trade. It relies on building networks to control international trade as a strategy (Thailand was the 80th country to ratify on January 21, 1983).

- 

Convention on the Conservation of Migratory Species of Wild Animals, 1979-Bonn Convention: This convention has the purpose of conserving only migratory species and their habitats along their migratory route.
- 

Convention on Biological Diversity, 1992-(CBD): The objective of this convention is the conservation of biodiversity for its sustainable use and to equally and justly share benefits from the use of those natural resources (Thailand was the 188th nation to ratify on January 29<sup>th</sup>, 2004).

## Target Species Conservation Areas

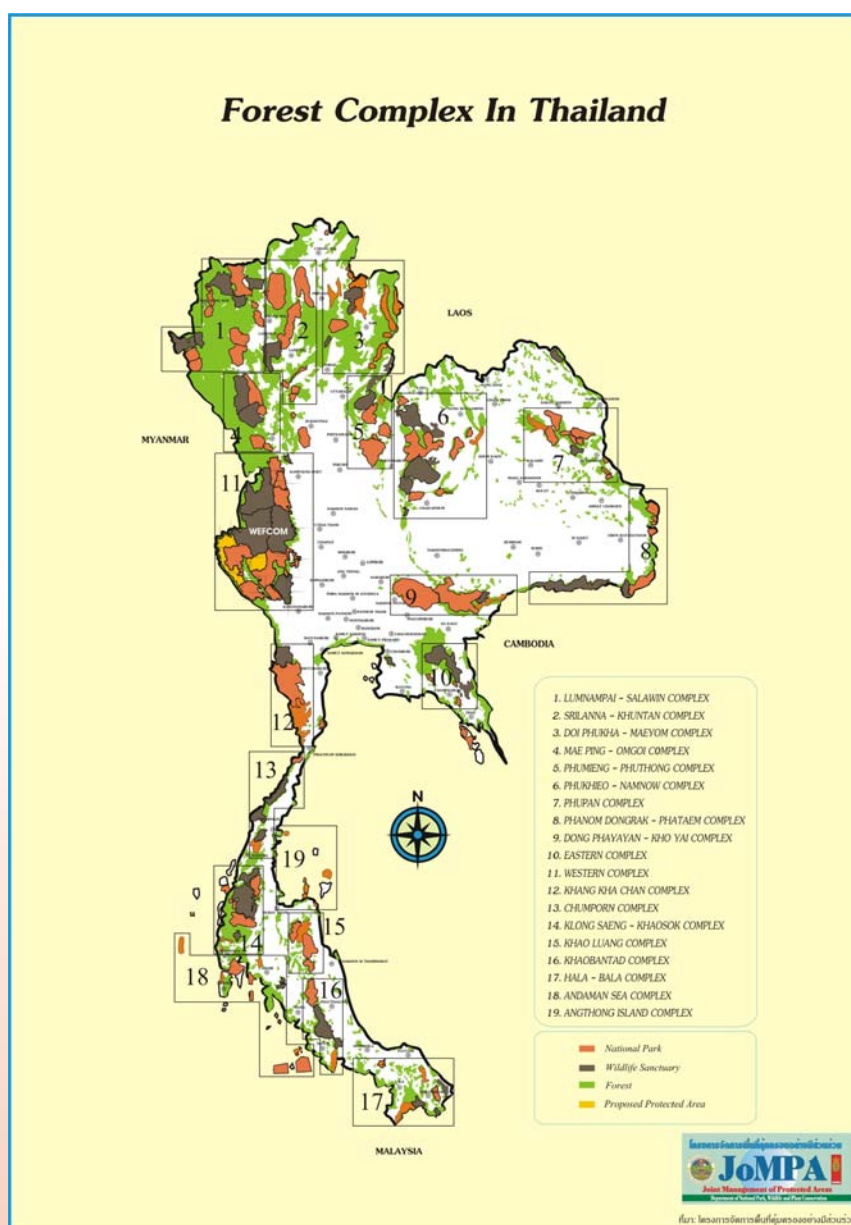
Protected areas are a tool for the conservation and restoration of biological diversity and natural habitat. Thailand has progressed a lot in the declaration of protected areas; there are currently 103 locations covering 52,782.2 km<sup>2</sup> or 10.29% of the country's land. There are 58 forest park (730 km<sup>2</sup>) or 0.14% of the country's land area, 55 wildlife sanctuaries (35,748.99 km<sup>2</sup>) or 6.97% of the country's land, 56 no-hunting areas (4,452.77 km<sup>2</sup>) or 0.87% of the country's land, 16 botanical gardens (60.14 km<sup>2</sup>) or 0.01% of the country's land, 55 arboreta (36.61 km<sup>2</sup>) or 0.01% percent of the country's land; all totaling up to 93,811.03 km<sup>2</sup> of conservation area in Thailand or 18.28% of the country's land (Table 7.1) (National Park, Wildlife and Plants Conservation Department, 2004 A)



**Table 7.1** Forest Conservation Areas 1999-2003

	1999		2000		2001		2002		2003	
	Locations	Km <sup>2</sup>	Locations	Km <sup>2</sup>	Locations	Km <sup>2</sup>	Locations	Km <sup>2</sup>	Locations	Km <sup>2</sup>
National Parks	96	48,927.81	102	52,226.10	102	52,263.52	102	52,263.52	103	52,782.20
Forest Parks	66	851.11	68	852.12	67	870.49	69	895.38	58	730.32
Wildlife Sanctuaries	48	33,433.51	53	34,848.80	55	34,897.76	56	35,911.15	55	35,748.99
No-hunting Areas	49	3,304.55	49	3,304.55	48	2,379.15	49	3,280.15	56	4,452.77
Botanical Gardens	15	58.96	15	58.96	15	58.96	16	63.65	16	60.14
Arboreta	53	35.83	54	36.08	54	36.08	54	36.08	55	36.61
<b>Total</b>		<b>86,611.77</b>		<b>91,326.61</b>		<b>90,505.96</b>		<b>92,449.93</b>		<b>93,811.03</b>

Source: National Park, Wildlife and Plant Conservation Department (2004 A)



**Figure 7.2** Important Forest Areas in Thailand




At present, conservation areas have been so disturbed and invaded, leaving only patch forests all over the country. Consequently, this raising the potential of organisms becoming endangered in the future due to a higher occurrence of inbreeding within the species. In 1999, the Royal Forest Department created a strategic plan for the protection of

conservation areas under their jurisdiction by arranging important forest lands that contain conservation areas close together into a large area. A total of 19 conservation forests (Figure 7.2) were brought together, including 17 forest lands and 2 other forests spread within marine areas (Royal Forest Department, 1999).

### BOX 7.4 World Heritage Sites

-  The United Nations Education, Scientific and Cultural Organization (UNESCO)'s World Heritage Committee has worked according to the terms and conditions of the Convention Concerning the Protection of World Culture and Natural Heritage (also known as the World Heritage Convention) to acquire 628 cultural heritage sites and 160 natural heritage sites and 24 cultural and natural heritage sites from 180 countries around the world (<http://wch.unesco.org>, 2005).
-  Thailand has also ratified the World Heritage Convention and has the Office of Natural Resources and Environmental Policy and Planning as the national central agency to act as the secretariat to the convention, with the Fine Arts Department and National Park, Wildlife and Plant Conservation Department as the agencies responsible for the cultural and natural heritage sites, respectively.

#### World Heritage Sites in Thailand

-  Five sites in Thailand have been declared as world cultural and natural heritage sites, including 3 cultural sites: Sukhothai-Si Satchanalai-Kamphaeng Phet Historical Parks (1991), Ayutthaya Historical Park (1991), and Ban Chiang Archeological Site (1992); and 2 natural sites: Thungyai Naresuan-Huai Kha Khaeng (1991) and Dong Phrayayen-Khao Yai Forests (2005) (WCS, 2005 B).

#### World Natural Heritage Sites in Thailand

##### *Tung Yai Naresuan-Huay Khakeng*

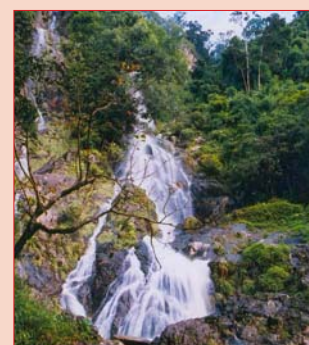
The Tung Yai Naresuan and Huay Khakeng wildlife sanctuaries consist of 4,015,087 rai or 6,424.14 km<sup>2</sup> and were set as the central conservation areas of the Western Forest Complex as they are very healthy and high in biodiversity value. The Western Forest Complex is also the largest conservation area in Thailand and Southeast Asia, made up of 17 conservation areas. Within the complex there are 11 national parks and 6 wildlife sanctuaries with a total of 11,706,586 rai or 18,739.54 km<sup>2</sup> along the Thanon Thongchai and Naosri mountain ranges, covering 6 provinces: Tak, Kanchanaburi, Khampengphet, Nakorn Sawan, Uthaihani, and Suphanburi. Several threatened wildlife species can be found within these two wildlife sanctuaries such as wild water buffalo (*Bubalus bubalis*), banteng (*Bos javanicus*), Asian tapir (*Tapirus indicus*), marbled cat (*Pardofelis marmorata*), tiger (*Panthera tigris*), rufous-necked hornbill (*Aceros nipalensis*), and green peafowl (*Pavo muticus*) (Suwannarungsi, 2002).



##### *Dong Phrayayen-Khao Yai Forests*

The Dong Phrayayen-Khao Yai forest complex is made up of 5 conservation areas which are Khao Yai National Park, Tublan National Park, Pang Sida National Park, Taphraya National Park, and Dong Phrayayen Wildlife Sanctuary, totaling 3,845,082.53 rai or 6,152.13 km<sup>2</sup>, and covering Nakorn Nayok, Nakorn Ratchasima, Prachinburi, Buriram and Srakaew provinces.

In the past Dong Phrayayen-Khao Yai forest complex was very dense and filled with large wildlife animals, but after World War II Thailand entered a phase of development which left the forests





**BOX 7.4 (countinue)**

stripped down agricultural production areas. The Friendship Road was built through the forest and destroyed much of it. On September 18, 1962 Khao Yai was declared as the first national park of Thailand and can be considered as the milestone that has allowed other efforts to continue to this day.

The Dong Phayayen-Khao Yai forest complex is still presently made up of a variety of forest types including Tropical rain forest, Dry evergreen forest, Pine forest, Mixed deciduous forest, Deciduous Dipterocarp forest, and Tropical grassland. This allows for a healthy and highly moist system which is also the head source of several important water bodies such as the Nakorn Nayok River, Bangpakong River, Prachinburi River, Phrapluerng and Taklong Streams. In addition, the Dong Phayayen-Khao Yai complex is also home to several wildlife specie; at lease 250-300 Asian elephants (*Elephas maximus*) have been reported 250-300, tiger (*Panthera tigris*) wreathed hornbill (*Aceros undulatus*) great hornbill (*Buceros bicornis*) and at least 2 sightings of the Siamese crocodile (*Crocodylus siamensis*) in the fresh water areas of Pang Sida National Park (Suwannarungsi, 2002).

**BOX 7.5 Wetlands**

Thailand was first involved with the Ramsar Convention since 1974 when it sent a delegate to the Heiligenhafen meeting in Germany 1995-1996. The Ministry of Science, Technology and Environment had coordinated with several other relevant agencies to obtain their opinions and suggestions and presented them to National Environment Board for consideration. The Board then approved Thailand's participation in the Convention at their first meeting on January 21, 1997.

The Cabinet then approved the motion to participate in the Ramsar Convention on August 26, 1997 and suggested the Pruankisian area within the Talaynoi no-hunting zone of Phatthalung province (an area of 3,085 rai) as the first World Wetland Site (Ramsar Site) in Thailand, making it the 110th member nation to the convention.

In 1995, the Office of Environmental Policy and Planning conducted the National Inventory of Natural Wetlands in Thailand with partial financial support from Danish Cooperation for Environment and Development (DANCED). The purpose of the project was to collect, inventory, and assess the status of natural and man-made wetlands in Thailand. The project also aims to improve the wetland database system for the planning and management of wetlands in Thailand, disseminate knowledge and understanding in the conservation and sustainable use of wetlands. The Office of Natural Resources and Environmental Policy and Planning has given Kasetsart University, Khon Khaen University, Mahidol University and Songkhla Nagarindhara University the responsibility to carry out education in the northern, northeastern, central, eastern, and southern regions, respectively. From the project it was found that:

There are 61 wetlands of international importance, 48 wetlands of national importance, 19, 295 wetlands of local importance, 9 wetlands that should be nominated as Ramsar Sites, and 28 wetlands in urgent need of protection and restoration in Thailand.

On August 26, 1997 the Cabinet approved Thailand's ratification of the Ramsar Convention and nominated the Pruankhisian Wetland as a wetland of international importance on June 13, 1998.

On July 5, 2001 the National Environmental Board approved the nomination of 5 more Ramsar sites:



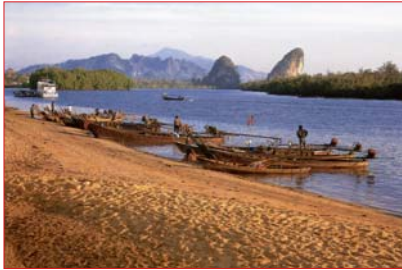
1. Nongbongkhai non-hunting area wetland, Chiang Rai



2. Bung Khonglong non-hunting area wetland, Nongkhai



3. Don Hoi Lod wetland, Samutsongkram



4. The wetland at the mouth of Krabi River, Krabi



5. Pruthodaeng or Her Majesty the Princess Sirindhorn's wildlife sanctuary, Narathiwat

On August 14, 2002, four more wetlands were declared as wetlands of international importance:



1. Jao Mai National Park wetland - Libong Island non-hunting area - Trang River wetland, Trang



3. Ang Thong Islands National Park, Surat Thani



4. Phangna Bay National Park wetland, Phangnga



2. Laemson National Park - Kraburi River - Kaper Canal wetland, Ranong

Since 2001 The Office of Natural Resource and Environmental Policy and Planning has been carrying out a project to manage and protect wetlands according to the Ramsar convention with partial funding from Danish Cooperation for Environment and Development (DANCED).

Source: <http://www.onep.go.th/wetlandsthai/mpw1.html> (2005)

## Target Conservation Species

The existing and future conservation areas are very important to the survival of organisms in the wild. *Ex situ* conservation, or conservation of species outside their natural habitats, also contributes to protection of threatened wildlife. The species targeted for preservation are those that have been categorized from extinct in the


wild to critically endangered, and from Thailand's Red Data: Vertebrates in 2005, 555 species have been targeted. This includes 120 mammals, 182 birds, 33 (34 forms) reptiles, 5 amphibians, and 215 fish. They have also been selected for preservation under the Wildlife Preservation and Protection Act, 1992, which also allows for their legal cultivation (from the Ministry regulations of 2003).


### BOX 7.6 Hume's pheasant (*Syrmaticus humiae*)


Hume's pheasant (*Syrmaticus humiae*) is categorized as Critically Endangered and is a protected species that may be legally cultivated. It is frequently found in elevated open canopy forests and sometimes forages in grasslands with tall trees as it flies slowly and not very far up. It feeds on plant seeds, fruit seeds, roots, buds, sprouts, insects, worms, and mates around May-June. The Hume's pheasant (*Syrmaticus humiae*) makes its nest under small shrubs by laying grass down for their eggs. It will lay 5-6 eggs and can be found in Assam province, southwestern China, Burma and the northwestern region of Thailand (Khobkhet, 1998).




### BOX 7.7 Tiger : Lord of the Jungle

 The tiger (*Panthera tigris*) is considered the largest feline species with a grey abdomen, a yellow or brownish-yellow, white stomach, black stripes along its back and side, and black lines on its tail. It also has very good hearing and eyesight but a rather relatively poorer sense of smell. A large male tiger may weigh over 300 kg.




 Because can be found in several geographic regions, the species may vary according to its climate and environment. Wildlife scientists have classified the tiger into 8 different races or subspecies: The Bali Tiger (*Panthera tigris balica*), the Java Tiger (*Panthera tigris sondaica*), the Caspian Tiger (*Panthera tigris virgata*), the Indo-Chinese Tiger (*Panthera tigris corbetti*) (which can be found in Thailand), the Bengal Tiger (*Panthera tigris tigris*), the Siberian Tiger (*Panthera tigris altaica*), the South China Tiger (*Panthera tigris amoyensis*), the Sumatra Tiger (*Panthera tigris sumatrae*).

 Tigers are able to adapt to various environments and can thus live in different climates and geographies such as tall mountains, flatlands, grasslands, evergreen forest, and deciduous forests. It can only be found in conservation areas in Thailand.

 The role of tigers and their prey in the ecosystem: the tiger controls the population of herbivores. If herbivorous species overpopulate, the chance of growth or survival of certain plant species will decrease which will affect the structure of the ecosystem and other organisms. Tigers thus eliminate weaker species as their prey and ensure the survival of the fitter species. However the population and genetic survival of tigers themselves depends on the amount and type of their prey.



**BOX 7.7 (countinue)**

-  The tiger is protected under the Wildlife Preservation and Protection Act, 1992 and is also one the species listed under CITES - its international trade is prohibited. It is also categorized as endangered under ONEP's Red Data assessment of threatened species 2005.
-  Presently, 3 of 8 subspecies of the tiger has been extinct from the world, with the potential of another becoming extinct within the next 10 years. The Bali Tiger (*Panthera tigris balica*) was the first to become extinct in 1940, then the Caspian Tiger (*Panthera tigris virgata*) in 1970, and the Java Tiger (*Panthera tigris sondaica*) as the last species to become extinct.
-  Dr. Alan Rabinowitz of the Wildlife Conservation Society (WCS) assessed the tiger population in Thailand in 1993 by surveying 38 places (25 national parks and 13 wildlife sanctuaries) and found tigers in only 58% of the area. From the density analysis of tigers, 1 tiger to 100 km, it was estimated that there were 250 tigers in Thailand (Rabinowitz, 1993 in reference to WCS Thailand, 2005). The second phase of assessment was completed by Tunhikorn and Smith (2004), with reference to WCS Thailand (2005a), who gathered information from the direct field observation. From interviews with conservation area officials, which was determined by the Tiger Action Plan, it was reported that tigers were found in at least 50 conservation areas within 15 of 17 terrestrial forest complexes. It was thus concluded that the tigers in Thailand can be divided into 15 population groups with the densest population in Western Forest Complex which surrounds the Thanaosri mountain range along the Thai-Burmese border. According to a camera trapping study by Simchareon (2005) in the central area of Huai Kha Khaeng wildlife sanctuary, which used the Capture Program for analysis, the density of tigers was found to be at 3-4 tigers per 100 km<sup>2</sup>.

Source: (WCS Thailand, 2005 A)



# Conclusion



**Figure 8-1** Taylor's warted tree frog (*Theloderma stellatum*) is categorized as Vulnerable (VU) and was found in the lower northeastern and southeastern regions of Thailand (Chan-ard, 2003). However habitat destruction of the Taylor's warted tree frog (*Theloderma stellatum*) has reduced its population drastically.



## Thailand Red Data: Vertebrates and the 2010 Biodiversity Target

Unsustainable development in many countries all over the world creates harmful impacts on natural resources and the environment. These countries have considered this serious problem and have thus joined forces to work together to reduce biological diversity loss at the global and national levels by the year 2010. In what is known as the 2010 Biodiversity Target, it is the countries goal to reduce poverty and preserve the world's natural resources which also streamline with the UN's Convention of Biological Diversity goals.


The Office of Natural Resources and Environmental Policy and Planning (ONEP) has assessed the status of vertebrate animals in Thailand that are Critically Endangered, Endangered, Rare, and Endemic, including mammals, birds, reptiles, amphibians and fish. They are categorized, listed and published under Thailand Red Data: Vertebrates which provides a database of information to aid in the management and reduction of threat to Thailand's biodiversity. The work began with the gathering and investigation of information on species, where they're found, their habitats, and identify the species that are threatened in Thailand. There was also the observation and study of the habitat status, the population size, its spread, as well as the organization of working progress meetings in order to improve species status. ONEP has also published and distributed Thailand Red Data: Vertebrates which can also be used as an information reference and has been widely accepted by all agencies involved in the management of threat

to Thailand's biodiversity. Further ONEP is responsible for the improvement of strategies and measures for the conservation and protection of species and their natural habitats for the reduction in Thailand's and the worlds biodiversity loss.

## Change in Status of Vertebrates 1996-2005

In 1996 ONEP (then the Office of Environmental Policy and Planning - OEPP) assessed the state of 114 mammals, 255 birds, 41 reptiles, 26 amphibians and 220 fish (not including the 4 types of fish that were assessed as threatened in the wild) But in 2005, ONEP did another assessment of the state of 159 mammals, 282 birds, 350 (366 forms) reptiles, 137 (138 forms) amphibians and 268 fish (not including 11 types of Threatened *in-situ* fish). It was found that of the species listed at the time, 38% of the mammals, 18% of the birds, 9% of the reptiles, 4% of amphibians, and 8% of the fish were assessed as threatened (either Critically Endangered, Endangered, or Vulnerable). If Thailand does not give importance to biodiversity conservation, the number of threatened species will increase, making it impossible to slow or reduce the rate of biodiversity loss according to the 2010 Target.

## Box 8.1 The Office of Natural Resources and Environmental Policy and Planning's (ONEP) 2010 Biodiversity Target

-  Project to assess the status of organisms in Thailand - ONEP, as the National Focal Point to the UN's Convention on Biological Diversity, has put together a list of the status of endangered vertebrate animals in Thailand (<http://chm-thai.onep.go.th/>). The list of threatened plant species will be completed by the end of this year. The list on invertebrate animals continues to be compiled and will be presented to the cabinet for consideration as the National Red List which will consist of protective and preventative measures as well as restore, survey and research these organisms population.
-  Project to survey and create a biodiversity database in biodiversity hotspots and biodiversity important areas (BIA) that will focus on forest, marine and coastal, inland water, dry and semi-humid, mountain, island, and agricultural ecosystems. In 2005, ONEP and Kasetsart University together chose several study areas including: Doi Inthanon forest area, the Phangna coast-Surin and Ang Thong islands, Num Ping, Pha Tam and Phao Tueb mountains, Phu Luang, elevated agricultural areas of Doi Inthanon-Jom Thong, and Koh Kret and Suan Rim Num in Nonthaburi Province. The information gathered will go to support the protection and restoration of the destroyed ecosystems, restore endangered species populations, and be disseminated to the public to create awareness of the importance of biodiversity to humans. The project will be presented in various forms for the purpose of education and will continue in other study areas in Phetchabun and Phitsanulok provinces the following years.
-  Project to list rare, endemic and endangered species of importance and create measures and regulations for their protection. ONEP, together with the Forestry Department of Kasetsart University aim to survey, research and assess the status of important plant species of Thailand that are endangered, rare, and endemic, and use this information to create a conservation plan, policies, measures and regulations to protect these species.
-  Global Strategy for Plant Conservation (GSPC) long-term goals to slow the loss of plant biodiversity from the world in the present and continuously into the future by creating understanding through the documentation, conservation, and sustainable use of plant biodiversity. Furthermore, public awareness and education of plant biodiversity conservation is also supported.
-  Green plant growth around Thailand project - ONEP began this project by planting *Radermachera ignea* (Kurz) Steenis (Family Bignoniaceae) a native plant species of Chiang Rai province alongside the entrance to Ramsar sites (wetlands of international importance), and at the Nong Bong Kai Non-Hunting Area. The project focused on the cooperation between government, private industry and locals to help care for Thailand's beautiful environment by planting native species in each province along roadsides, in front of temples, schools and all over the country. This aimed to increase green space for communities, attract tourists, and restore the changing ecosystems.

The Clearing - House Mechanism (CHM) ONEP has gathered biodiversity information and has made it available to the public and involved agencies via the CHM including the Department of National Parks, Department of Agriculture, Department of Livestock Development, and Department of Fisheries. ONEP has also created the Department Clearing House (DCH) which acts as a center for news and also links information together from various sources. In the future it will expand its work to universities across the country for them to also help collect biodiversity information into their own centers or University Clearing House (UCH). The CHM help support further development and research on biological diversity.

## ***Threatened and Endangered Organisms***

In the past wildlife and wildlife habitats were spread all over the different regions of Thailand, but presently a large area of forest land has been rapidly destroyed and only patches remain. This affects wildlife habitat and rapidly reduces the population of wildlife or potentially endanger them. Habitat destruction, overexploitation, invasion of alien species, spread of disease, environmental pollution and climate change all cause wildlife decrease or endangerment as they are unable to adapt to changing environments. Other causes include natural hazards such as the tsunami.

## ***Research and species conservation***

There is not enough data or research currently being done in Thailand on organisms when compared to the number of species recorded. In the assessment of 2005, at least 179 species of wildlife were considered as data deficient of which 7% were mammals, 5% birds, 51% reptiles, 20% amphibians, and 17% fish. Other than these species, the species that are categorized as extinct in the wild and vulnerable are also targeted for study.

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# ANNEXS

An Inventory of Threatened Species in Thailand : Vertebrates)



Photo by Supachai Kirdratanasak

## Mammals

For mammals, 1 species is extinct (Table 1), 4 are extinct in the wild (Table 2), 12 are critically endangered (Table 3), 35 are endangered (Table 4), 69 are vulnerable (Table 5), 15 are near threatened (Table 6), 10 are least concern (Table 7), 13 are data deficient (Table 8) and 5 species are endemic (Table 9).

**Table 1 Mammal (Extinct-EX)**

สมัน	<i>Cervus schomburgki</i>
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**Table 2 Mammals (Extinct in the Wild-EW)**

กูปรี	<i>Bos sauveli</i>
ละอง, ละมั่ง	<i>Cervus eldii</i>
กระซู่	<i>Dicerorhinus sumatrensis</i>
แรด	<i>Rhinoceros sondaicus</i>

**Table 3 Mammals (Critically Endangered-CR)**

วัวแดง	<i>Bos javanicus</i>
กระรอกสามสี	<i>Callosciurus prevostii</i>
ค้างคาวคุณกิตติ	<i>Craseonycteris thonglongyai</i>
อีเห็นน้ำ	<i>Cynogale bennettii</i>
พะยูน	<i>Dugong dugon</i>
เสือกระทาย	<i>Felis chaus</i>
ชะนีมือดำ	<i>Hylobates agilis</i>
แมวป่าหัวแบน	<i>Ictailurus planiceps</i>
นากใหญ่หัวปลาคูก,	<i>Lutra sumatrana</i>
นากใหญ่จุ่มขน	
วาฬฟันเขี้ยว	<i>Mesoplodon ginkgodens</i>
กวางผา	<i>Naemorhedus caudatus</i>
โลมาอิรวดี	<i>Orcaella brevirostris</i>

**Table 4 Mammals (Endangered-EN)**

เนื้อทราย	<i>Axis porcinus</i>
วาฬแกลบ, วาฬบรูด้า,	<i>Balaenoptera edeni</i>
วาฬซิทัตัง	
วาฬฟิน, วาฬแกลบ	<i>Balaenoptera physalus</i>
ครีบน้ำดำ	
ควายป่า	<i>Bubalus bubalis</i>
โลมาปากยาว	<i>Delphinus capensis</i>
ช้างป่า	<i>Elephas maximus</i>
ค้างคาวท้องสีน้ำตาล	<i>Eptesicus demissus</i>
สุราษฏร์	
วาฬเพชรฆาตเล็ก	<i>Feresa attenuata</i>
วาฬน้ำร่องครีบสั้น	<i>Globicephala macrorhynchus</i>

**Table 4 Mammals (Endangered-EN) (continue)**

อีเห็นลายพาด	<i>Hemigalus derbyanus</i>
ค้างคาวหน้ายักษ์จุ่มกุ่ม	<i>Hipposideros halophyllus</i>
ชะนีมงกุฏ	<i>Hylobates pileatus</i>
วาฬหัวทุยเล็ก	<i>Kogia breviceps</i>
วาฬหัวทุยแคระ	<i>Kogia simus</i>
นากใหญ่ภูเขา	<i>Lutra lutra</i>
ลิงอายเจียะ	<i>Macaca assamensis</i>
ลิ่นจีน	<i>Manis pentadactyla</i>
แกมมอ	<i>Muntiacus feae</i>
เพียงพอนเส้นหลังขาว	<i>Mustela strigidorsa</i>
โลมาหัวบาตรหลังเรียบ	<i>Neophocaena phocaenoides</i>
หนูขนเสี้ยนเขาหินปูน	<i>Niviventer hinpoon</i>
วาฬเพชรฆาต	<i>Orcinus orca</i>
เสือโคร่ง	<i>Panthera tigris</i>
แมวลายหินอ่อน	<i>Pardofelis marmorata</i>
โลมาหัวแดงโม	<i>Peponocephala electra</i>
วาฬหัวทุย	<i>Physeter macrocephalus</i>
ชะมดแปดลายจุด	<i>Prionodon pardicolor</i>
ค้างคาวมงกุฎหูโต	<i>Rhinolophus marshalli</i>
มาร์แชล	
โลมาลายจุด	<i>Stenella attenuate</i>
โลมาแถบ	<i>Stenella coeruleoalba</i>
โลมาฟันห่าง	<i>Steno bredanensis</i>
กระรอกหางม้าใหญ่	<i>Sundasciurus hippurus</i>
สมเสร็จ	<i>Tapirus indicus</i>
กระจงควาย	<i>Tragulus napu</i>
ชะมดแผงสันหางดำ	<i>Viverra megaspila</i>

**Table 5 Mammals (Vulnerable-VU)**

หนูผีป่าหางจู้	<i>Anourosorex squamipes</i>
กระรอกบินเทาขน	<i>Belomys pearsonii</i>
กระทิง	<i>Bos gaurus</i>
หมาจิ้งจอก	<i>Canis aureus</i>
ค้างคาวขนช้าง	<i>Cheiromeles torquatus</i>
ค้างคาวอายแหวง	<i>Coelops frithi</i>
หมาใน	<i>Cuon alpinus</i>
กระแตหางหนู	<i>Dendrogale murina</i>
ค้างคาวด้ายค	<i>Dyacopteris spadiceus</i>
หนูเหม็น, สาทอ	<i>Echinosorex gymnurus</i>
หนูน้ำดอยอ่างกา	<i>Eothenomys miletus</i>
ค้างคาวท้องสีน้ำตาล	<i>Eptesicus pachyotis</i>
หูหนา	
ค้างคาวท้องสีน้ำตาลใหญ่	<i>Eptesicus serotinus</i>
หนูไฟเล็บแม่มือแบน	<i>Hapalomys longicaudatus</i>
ค้างคาวปีกขนใต้	<i>Harpiocephalus harpia</i>
หมีหมา	<i>Helarctos malayanus</i>
ค้างคาวฟันหน้าซ่อนเล็ก	<i>Hesperoptenus blanfordi</i>



**Table 5 Mammals (Vulnerable-VU) (continue)**

ค้างคาวพันทนาซอนใหญ่	<i>Hesperoptenus tickelli</i>
ค้างคาวหน้ายักษ์	<i>Hipposideros lekaguli</i>
หมอบนุญสูง	
ค้างคาวหน้ายักษ์	<i>Hipposideros turpis</i>
กุมภกรรณ	
ชะนีมือขาว	<i>Hylobates lar</i>
กระรอกบินเล็กเขาสูง	<i>Hylopetes alboniger</i>
กระรอกบินแกมสีแดง	<i>Hylopetes spadicus</i>
ค้างคาวอีอาอีโอ	<i>la io</i>
ค้างคาวยอดกล้วยปึกใส	<i>Kerivoula hardwickei</i>
ค้างคาวยอดกล้วยปึกปุม	<i>Kerivoula papillosa</i>
ค้างคาวยอดกล้วยป่า	<i>Kerivoula whiteheadi</i>
ค้างคาวยอดกล้วยเล็ก	<i>Kerivoula minuta</i>
กระรอกดินหลังลาย	<i>Lariscus insignis</i>
หนูเขาสูง	<i>Leopoldamys edwardsi</i>
หนูถ้ำ	<i>Leopoldamys neilli</i>
นากอใหญ่ขนเรียบ	<i>Lutrogale perspicillata</i>
ลิงเสน	<i>Macaca arctoides</i>
หนูฟันเล็ก	<i>Maxomys whiteheadi</i>
ค้างคาวจมูกหลอด	<i>Murina leucogaster</i>
ทองขาว	
เพียงพอนเล็กสีน้ำตาล	<i>Mustela nudipes</i>
เพียงพอนเหลือง	<i>Mustela sibirica</i>
ค้างคาวหูหนูดอยอ่างขาง	<i>Myotis altarium</i>
ค้างคาวหูหนูยักษ์	<i>Myotis chinensis</i>
เสือลายเมฆ	<i>Neofelis nebulosa</i>
ค้างคาวกินแมลงหัวสั้น	<i>Nyctalus noctula</i>
ค้างคาวหนารอง	<i>Nycteris tragata</i>
เสือดำ, เสือด่า	<i>Panthera pardus</i>
พญากระรอกบินหูดำ	<i>Petaurista elegans</i>
กระรอกบินจิ๋วมลายู	<i>Petinomys vordermanni</i>
ค้างคาวพันทนา	<i>Phoniscus atrox</i>
ค้างคาวดำ	<i>Presbytis femoralis</i>
เสือปลา	<i>Prionailurus viverrinus</i>
ชะมดแปลงลายแถบ	<i>Prionodon linsang</i>
เสือไฟ	<i>Profelis temminckii</i>
วาฬเพชรฆาตดำ	<i>Pseudorca crassidens</i>
ค้างคาวแม่ไก่ป่าฝน	<i>Pteropus vampyrus</i>
กระแตหางขนนก	<i>Ptilocercus lowii</i>
หนูเกาะ	<i>Rattus remotus</i>
พญากระรอกเหลือง	<i>Ratufa affinis</i>
ค้างคาวมงกุฎหูโตใหญ่	<i>Rhinolophus paradoxolophus</i>
ค้างคาวมงกุฎเลียน	<i>Rhinolophus robinsoni</i>
มลายูเล็ก	
ค้างคาวหางหนู	<i>Rhinopoma microphyllum</i>
กระรอกหน้ากระแต	<i>Rhinosciurus laticaudatus</i>
ค้างคาวดอยหลังลายขาว	<i>Scotomanes ornatus</i>

**Table 5 Mammals (Vulnerable-VU) (continue)**

ค้างแว่นถิ่นใต้	<i>Semnopithecus obscurus</i>
ค้างแว่นถิ่นเหนือ	<i>Semnopithecus phayrei</i>
โลมาเผือก	<i>Sousa chinensis</i>
ค้างคาวดอย	<i>Sphaerias blanfordi</i>
โลมากระโดด	<i>Stenella longirostris</i>
ค้างคาวหูหนา	<i>Tadarida teniotis</i>
ค้างคาวปีกถุงปลอม	<i>Taphozous saccolaimus</i>
โลมาปากขวด	<i>Tursiops aduncus</i>
หมีควาย	<i>Ursus thibetanus</i>

**Table 6 Mammals (Near Threatened-NT)**

เลี้ยงผา	<i>Capricornis sumatraensis</i>
ค้างคาวปากย่นมลายู	<i>Chaerephon johorensis</i>
หนูฝิ่นงา	<i>Crociodura pullata</i>
ชะนีใหญ่	<i>Hylobates syndactylus</i>
ลิงกังใต้	<i>Macaca nemestrina</i>
ลิงชวา	<i>Manis javanica</i>
ค้างคาวจมูกหลอดหูยาว	<i>Murina huttonii</i>
ค้างคาวหูหนูหน้าขน	<i>Myotis annectans</i>
ค้างคาวหูหนูพม่า	<i>Myotis montivagus</i>
ค้างคาวกรามหนานเล็ก	<i>Pipistrellus cadorna</i>
ค้างคาวลูกหนูถ้ำ	<i>Pipistrellus pulveratus</i>
ค้างคาวแม่ไก่เกาะ	<i>Pteropus hypomelanus</i>
ค้างคาวแม่ไก่ภาคกลาง	<i>Pteropus lylei</i>
ค้างคาวงอก	<i>Semnopithecus germaini</i>
ค้างคาวหูหนามมลายู	<i>Tadarida mops</i>

**Table 7 Mammals (Least Concern-LC)**

เม่นหางพวง	<i>Atherurus macrourus</i>
หนูไม้เล็บแม่มือแบน	<i>Chiromyscus chiropus</i>
ค้างคาวขอบหูขาวใหญ่	<i>Cynopterus horsfieldii</i>
เม่นใหญ่	<i>Hystrix brachyura</i>
พญากระรอกบินหูขาว	<i>Petaurista alborufus</i>
พญากระรอกบินหูแดง	<i>Petaurista petaurista</i>
พญากระรอกบินหูดำ	<i>Petaurista philippensis</i>
หางสีเข้ม	
หนูป่าพรุ	<i>Rattus annandalei</i>
พญากระรอกดำ	<i>Ratufa bicolor</i>
อнокกลาง	<i>Rhizomys pruinosus</i>

**Table 8 Mammals (Data Deficient-DD)**

กระรอกข้างลายท้องเทา	<i>Callosciurus nigrovittatus</i>
ค้างคาวอายแหวงเล็ก	<i>Coelops robinsoni</i>
หนูฝิ่นภูเขา	<i>Crociodura monticola</i>
ค้างคาวขอบหูขาวเล็กป่า	<i>Cynopterus sp.</i>
ค้างคาวปีกพับกลาง	<i>Miniopterus medius</i>

**Table 8 Mammals (Data Deficient-DD) (continue)**

เพียงพอนดอยผ้าห่มปก	<i>Mustela nivalis</i>
กระรอกบินสีเข้ม	<i>Pteromyscus pulverulentus</i>
ค้างคาวแม่ไก่นครสวรรค์	<i>Pteropus intermedius</i>
หนูภูหลวง	<i>Rattus osgoodi</i>
ค้างคาวมงกุฎอินเดีย	<i>Rhinolophus rouxii</i>
ค้างคาวมงกุฎหูโตเล็ก	<i>Rhinolophus siamensis</i>
หนูผีหางยาวพื้นแดง	<i>Soriculus parka</i>
หนูผีป่า	<i>Suncus malayanus</i>

**Table 9 Mammals (Endemic)**

สมัน	<i>Cervus schomburgki</i>
ค้างคาวท้องสีน้ำตาล	<i>Eptesicus demissus</i>
สุราษฎร์	
ค้างคาวหน้ายักษ์จมูกป้อม	<i>Hipposideros halophyllus</i>
หนูถ้ำ	<i>Leopoldamys neilli</i>
หนูชนเลี้ยงเขาหินปูน	<i>Niviventer hinpoon</i>

## Birds

Birds, 2 species are extinct (Table 1), 2 are extinct in the wild (Table 2), 43 are critically endangered (Table 3), 66 are endangered (Table 4), 71 are vulnerable (Table 5), 89 are near threatened (Table 6), 9 are data deficient (Table 7), 2 are endemic (table 8).

**Table 1 Birds (Extinct-EX)**

นกพงหญ้า	<i>Graminicola bengalensis</i>
นกซ่อนหอยใหญ่	<i>Pseudibis gigantea</i>

**Table 2 Birds (Extinct in the Wild-EW)**

นกกระเรียน	<i>Grus antigone</i>
นกซ่อนหอยดำ	<i>Pseudibis davisoni</i>

**Table 3 Birds (Critically Endangered-CR)**

นกเงือกปากยื่น	<i>Aceros corrugatus</i>
นกกะเต็นเฮอคิวลิส	<i>Alcedo hercules</i>
นกน้อดดี	<i>Anous stolidus</i>
นกเงือกดำ	<i>Anthraceros malayanus</i>
นกกระทาดงปักข์ใต้	<i>Arborophila charltonii</i>
นกกระสาใหญ่	<i>Ardea sumatrana</i>
นกปากกบยักษ์	<i>Batrachostomus auritus</i>
นกเค้าใหญ่สีคล้ำ	<i>Bubo coromandus</i>
เป็ดกา	<i>Cairina scutulata</i>
นกกระสาคอขาว	<i>Ciconia episcopus</i>

**Table 3 Birds (Critically Endangered-CR) (continue)**

นกกระสาคอขาวปากแดง	<i>Ciconia stormi</i>
นกหัวขวานดำ	<i>Dendrocopos mahrattensis</i>
หน้าผากเหลือง	
นกกระสาคอดำ	<i>Ephippiorhynchus asiaticus</i>
นกกระแตผีชายหาด	<i>Esacus neglectus</i>
นกกระแตผีใหญ่	<i>Esacus recurvirostris</i>
นกโจรสลัดเกาะคริสต์มาส	<i>Fregata andrewsi</i>
นกหัวขวานหัวเหลือง	<i>Gecinulus grantia</i>
อีแร้งเทาหลังขาว	<i>Gyps bengalensis</i>
อีแร้งสีน้ำตาล	<i>Gyps tenuirostris</i>
นกฟินฟุต	<i>Heliopais personata</i>
เหยี่ยวปลาใหญ่หัวเทา	<i>Ichthyophaga ichthyaetus</i>
นกจูดินลาย	<i>Kenopia striata</i>
นกตะกราม	<i>Leptoptilos dubius</i>
นกตะกรุม	<i>Leptoptilos javanicus</i>
โกไฟาหน้าเขียว	<i>Lophura ignita</i>
เหยี่ยวค้างคาว	<i>Macheiramphus alcinus</i>
นกกระสาปากเหลือง	<i>Mycteria cinerea</i>
นกแต้วแล้วเขียวเขมร	<i>Pitta ellioti</i>
นกแต้วแล้วทองดำ	<i>Pitta gurneyi</i>
นกแว่นสีน้ำตาล	<i>Polyplectron malacense</i>
นกเจ้าฟ้าหญิงสิรินธร	<i>Pseudochelidon sirintarae</i>
นกปรอดดำปีกขาว	<i>Pycnonotus melanoleucos</i>
นกปรอดแม่ทะ	<i>Pycnonotus zeylanicus</i>
โกเอนวล	<i>Rhizothera longirostris</i>
พญาแร้ง	<i>Sarcogyps calvus</i>
เป็ดหงษ์	<i>Sarkidiornis melanotos</i>
นกไต้ไม้สีเขียว	<i>Sitta formosa</i>
นกนางนวลแกลบท้องดำ	<i>Sterna acuticauda</i>
นกนางนวลแกลบแม่น้ำ	<i>Sterna aurantia</i>
นกนางนวลแกลบจีน	<i>Sterna bernsteini</i>
นกบูบีสีน้ำตาล	<i>Sula leucogaster</i>
โกไฟาหางลายขวาง	<i>Syrmaticus humiae</i>
นกเปลาแดง	<i>Treron fulvicollis</i>

**Table 4 Birds (Endangered-EN)**

นกกระจอยคอดำ	<i>Abroscopus albogularis</i>
นกเงือกหัวหงอก	<i>Aceros comatus</i>
นกเงือกคอแดง	<i>Aceros nipalensis</i>
นกเงือกกรามข้าง	<i>Aceros subruficollis</i>
ปากเรียบ	
นกพงนาพันธุ้แมนจูเรีย	<i>Acrocephalus tangorum</i>
นกกีบปลีแดง	<i>Aethopyga temminckii</i>
นกมู่นรคอแดง	<i>Alcippe rufogularis</i>
นกอายงั่ว	<i>Anhinga melanogaster</i>
นกอินทรีปีกลาย	<i>Aquila clanga</i>
นกอินทรีหัวไหลขาว	<i>Aquila heliaca</i>

Table 4 Birds (Endangered-EN) (continue)

นกกระทาแดงจันทบูร	<i>Arborophila cambodiana</i>
เบ็ดดำหัวดำ	<i>Aythya baeri</i>
นกปากกบปักชไต	<i>Batrachostomus stellatus</i>
นกเงือกหัวแรด	<i>Buceros rhinoceros</i>
นกชนหิน	<i>Buceros vigil</i>
นกชายเลนปากช้อน	<i>Calidris pygmeus</i>
นกกระทาสองต้อย	<i>Caloperdix ocellata</i>
นกกะปูดนิ้วสั้น	<i>Centropus rectunguis</i>
นกหัวโตมลายู	<i>Charadrius peronii</i>
นกมุดน้ำ	<i>Cinclus pallasii</i>
นกสาริกาเขียวหางสั้น	<i>Cissa hypoleuca</i>
นกปีกแพรสีม่วง	<i>Cochoa purpurea</i>
นกขัติยา	<i>Cutia nipalensis</i>
นกหัวขวานสามนิ้วหลังสีไพล	<i>Dinopium rafflesii</i>
นกยางจีน	<i>Egretta eulophotes</i>
นกกระรางหางแดง	<i>Garrulax milnei</i>
นกขุนแผนท้ายทอยแดง	<i>Harpactes kasumba</i>
นกขุนแผนตะโพกสีน้ำตาล	<i>Harpactes orrhophaeus</i>
นกพรานฝั่ง	<i>Indicator archipelagicus</i>
นกกินแมลงปากหนา	<i>Malacocincla sepiarium</i>
นกกินแมลงหัวสีคล้ำ	<i>Malacopteron affine</i>
นกกะเต็นขาวดำใหญ่	<i>Megaceryle lugubris</i>
นกโพระดกหลากสี	<i>Megalaima rafflesii</i>
เหยี่ยวดำ	<i>Milvus migrans</i>
นกจับแมลงอกสีน้ำตาล	<i>Muscicapa muttui</i>
นกจู่เต็นเขาปูน	<i>Napothera crispifrons</i>
นกจู่เต็นตีนใหญ่	<i>Napothera macrodactyla</i>
นกเค้าแดง	<i>Otus rufescens</i>
นกเค้าหน้าผากขาว	<i>Otus sagittatus</i>
นกยูงไทย	<i>Pavo muticus</i>
นกกระทง	<i>Pelecanus philippensis</i>
นกกาหน้าใหญ่	<i>Phalacrocorax carbo</i>
นกหัวขวานเขียวทองลาย	<i>Picus xanthopygus</i>
นกแต้วแล้วยักษ์	<i>Pitta caerulea</i>
นกแต้วแล้วแดงมลายู	<i>Pitta granatina</i>
นกแต้วแล้วใหญ่หัวสีน้ำเงิน	<i>Pitta soror</i>
นกปากช้อนหน้าดำ	<i>Platalea minor</i>
นกแว่นภูเขา	<i>Polyplectron inopinatum</i>
นกอัญชันหางดำ	<i>Porzana bicolor</i>
นกกาฝากอกแดง	<i>Prionochilus thoracicus</i>
นกแก้วโม่ง	<i>Psittacula eupatria</i>
นกหกใหญ่	<i>Psittinus cyanurus</i>
นกเป่าหน้าแดงไก่อู	<i>Ptilinopus jambu</i>
	<i>Rollulus rouloul</i>

Table 4 Birds (Endangered-EN) (continue)

นกยอดหญ้าหลังดำ	<i>Saxicola jerdoni</i>
นกไต้ไม้ใหญ่	<i>Sitta magna</i>
เหยี่ยวทองอนสีน้ำตาลทองขาว	<i>Spizaetus nanus</i>
นกกินแมลงหูขาว	<i>Stachyris leucotis</i>
นกนางนวลแกลบสีกุหลาบ	<i>Sterna dougallii</i>
นกจู่จู่ทองเทา	<i>Tesia cyaniventer</i>
นกซอนหอยขาว	<i>Threskiornis melanocephalus</i>
นกเป่าใหญ่	<i>Treron capellei</i>
นกเป่าเล็กหัวเทา	<i>Treron olax</i>
นกยางเขนแดงหางแดง	<i>Trichixos pyrropyga</i>
นกทะเลขาเขียวลายจุด	<i>Tringa guttifer</i>
นกเดินดงหัวน้ำตาลแดง	<i>Zoothera interpres</i>

Table 5 Birds (Vulnerable-VU)

นกกะเต็นสร้อยคอสีน้ำตาล	<i>Actenoides concretus</i>
นกตีดหัวแดง	<i>Aegithalos concinnus</i>
นกกะเต็นน้อยแถบอกดำ	<i>Alcedo euryzona</i>
นกปรอดสีคล้ำใต้คอเหลือง	<i>Alophoixus finschii</i>
เป็ดหน้าเหลือง	<i>Anas formosa</i>
นกเงือกสีน้ำตาล	<i>Anorrhinus tickelli</i>
ห่านเทาปากดำ	<i>Anser cygnoides</i>
นกแอ่นทองลาย	<i>Apus acuticauda</i>
นกกระทาดงอกเทา	<i>Arborophila campbelli</i>
นกกระสาแดง	<i>Ardea purpurea</i>
นกหว่า	<i>Argusianus argus</i>
เบ็ดดำหัวสีน้ำตาล	<i>Aythya nyroca</i>
นกปีกสั้นสีน้ำเงิน	<i>Brachypteryx montana</i>
นกขาปีไหน	<i>Caloenas nicobarica</i>
นกโกโรโกโส	<i>Carpococcyx renauldi</i>
นกเปลือกไม้	<i>Certhia discolor</i>
นกพิราบเขาสูง	<i>Columba pulchricollis</i>
นกกลมพู่แดง	<i>Columba punicea</i>
นกจับแมลงป่าชายเลน	<i>Cyornis rufigastra</i>
นกจับแมลงคอสีฟ้าสด	<i>Cyornis turcosus</i>
นกหัวขวานอกแดง	<i>Dendrocopos cathpharius</i>
นกหัวขวานดำทองน้ำตาลแดง	<i>Dendrocopos hyperythrus</i>
นกยางเขนหน้าหลังดำ	<i>Enicurus immaculatus</i>
นกคอสามสี	<i>Eupetes macrocerus</i>
เหยี่ยวเพเรกริน	<i>Falco peregrinus</i>
นกจับแมลงอกสีส้ม	<i>Ficedula dumetoria</i>
นกปากซ่อมพง	<i>Gallinago nemoricola</i>
นกกระรางอกลาย	<i>Garrulax merulinus</i>

Table 5 Birds (Vulnerable-VU) (continue)

นกอินทรีหัวสีนวล	<i>Haliaeetus leucoryphus</i>
นกขุนแผนหัวดำ	<i>Harpactes diardii</i>
นกเขนน้อยปีกดำ	<i>Hemipus hirundinaceus</i>
เหยี่ยวปลาเล็กหัวเทา	<i>Ichthyophaga humilis</i>
นกเขนน้อยคิ้วขาว	<i>Lalage nigra</i>
นกช่อมทะเลอกแดง	<i>Limnodromus semipalmatus</i>
นกกระรางแกมแดง	<i>Liocichla phoenicea</i>
นกกระตีดหัวขาว	<i>Lonchura maja</i>
นกเขนน้อยหัวดำ	<i>Luscinia obscura</i>
นกกินแมลงหลังฟู	<i>Macronous ptilosus</i>
เปิดปากยาวข้างลาย	<i>Mergus squamatus</i>
นกคิ้วหางสีตาล	<i>Minla strigula</i>
นกจับแมลงสีฟ้าจิว	<i>Muscicapella hodgsoni</i>
นกกระตีดใหญ่ปีกลาย	<i>Mycerobas melanozanthos</i>
นกกาบบัว	<i>Mycteria leucocephala</i>
นกกินปลีคอสีทองแดง	<i>Nectarinia calcostetha</i>
นกขมิ้นขาว	<i>Oriolus mellianus</i>
นกปากนกแก้วคิ้วดำ	<i>Paradoxornis atosuperciliaris</i>
นกปากนกแก้วหางสั้น	<i>Paradoxornis davidianus</i>
นกพญาไฟเล็กคอดำ	<i>Pericrocotus igneus</i>
นกกระจัดคิ้วดำทองขาว	<i>Phylloscopus cantator</i>
นกกระจัดคอสีเทา	<i>Phylloscopus maculipennis</i>
นกแต้วแล้วป่าชายเลน	<i>Pitta megarhyncha</i>
นกกาหน้อยปีกแถบขาว	<i>Platysmurus leucopterus</i>
เหยี่ยวเล็กตะโพกขาว	<i>Polihierax insignis</i>
นกปรอดหงอนหลังลาย	<i>Pycnonotus eutilotus</i>
นกจับแมลง อกสีน้ำตาลอ่อน	<i>Rhinomyias brunneata</i>
นกจับแมลงอกเทา	<i>Rhinomyias umbratilis</i>
นกอีแพรดคิ้วขาว	<i>Rhipidura aureola</i>
นกอีแพรดดอกลาย	<i>Rhipidura perlata</i>
นกนางแอ่นทราย สีน้ำตาล	<i>Riparia paludicola</i>
นกกรีดน้ำ	<i>Rynchops albigollis</i>
นกกินแมลงตะโพกแดง	<i>Stachyris maculata</i>
นกกินแมลงคอดำ	<i>Stachyris nigricollis</i>
นกเค้าป่าหลังจุด	<i>Strix seloputo</i>
นกกะลิงเขียดหางหนาม	<i>Temnurus temnurus</i>
นกจูนูหัวสีตาล	<i>Tesia castaneocoronata</i>
นกเปล้าขาเหลือง	<i>Treron phoenicoptera</i>
นกเปล้าหางเข้ม หัวปีกแดง	<i>Treron seimundi</i>
นกเปล้าทองขาว	<i>Treron sieboldii</i>
นกเดินดงอกเทา	<i>Turdus feae</i>
นกกระแตหาด	<i>Vanellus duvaucelii</i>
นกภูหงอนพม่า	<i>Yuhina humilis</i>

Table 6 Birds (Near Threatened-NT)

นกเงือกกรมช้าง	<i>Aceros undulatus</i>
นกเอี้ยงควาย	<i>Acridotheres fuscus</i>
อีแร้งดำหิมาลัย	<i>Aegyptius monachus</i>
นกกินปลีหางยาวเขียว	<i>Aethopyga nipalensis</i>
นกมู่นรกรหน้าผากน้ำตาล	<i>Alcippe dubia</i>
นกมู่นรกรคิ้วดำ	<i>Alcippe grotei</i>
นกมู่นรกรภูเขา	<i>Alcippe peracensis</i>
นกปรอดโองแกมเทา	<i>Alophoixus bres</i>
นกกระตีดแดง	<i>Amandava amandava</i>
นกเงือกปากดำ	<i>Anorrhinus galeritus</i>
นกอินทรีทุ่งหญ้าสเตปป์	<i>Aquila nipalensis</i>
นกอินทรีสีน้ำตาล	<i>Aquila rapax</i>
นกปลีกล้วยปากยาว	<i>Arachnothera robusta</i>
นกกระทาดงอกสีน้ำตาล	<i>Arborophila brunneopectus</i>
นกกระทาดงคอสีแสด	<i>Arborophila rufogularis</i>
เหยี่ยวกิ่งก้าน้ำตาล	<i>Aviceda jerdoni</i>
นกปากกบลายดำ	<i>Batrachostomus hodgsoni</i>
นกปากกบพันธุ์ขาว	<i>Batrachostomus javensis</i>
นกเค้าใหญ่พันธุ์เนปาล	<i>Bubo nipalensis</i>
นกเค้าใหญ่พันธุ์สุมาตรา	<i>Bubo sumatranus</i>
นกกก, นกกาฮัง	<i>Buceros bicornis</i>
นกกระแตผีเล็ก	<i>Burhinus oedicephalus</i>
เหยี่ยวปีกแดง	<i>Butastur liventer</i>
นกหัวโตปากยาว	<i>Charadrius placidus</i>
นกหัวโตขาวยาว	<i>Charadrius veredus</i>
นกปีกแพรสีเขียว	<i>Cochoa viridis</i>
นกแอ่นทองขาว	<i>Collocalia esculenta</i>
นกแอ่นหางสีเหลือง	<i>Collocalia maxima</i>
นกคุ่มสี	<i>Coturnix chinensis</i>
นกคุ่มอกดำ	<i>Coturnix coromandelica</i>
นกจับแมลงสีคล้ำ หางแถบขาว	<i>Cyornis concretus</i>
นกกาฝากทองเหลือง	<i>Dicaeum melanoxanthum</i>
นกหัวขวานใหญ่สีดำ	<i>Dryocopus javensis</i>
นกคุ่มพู่	<i>Ducula aenea</i>
นกกระตีดเขียว	<i>Erythrura prasina</i>
เหยี่ยวฮอบบี้พันธุ์เอเชีย	<i>Falco severus</i>
นกอีลุ้ม	<i>Gallicrex cinerea</i>
นกกระรางคอดำ	<i>Garrulax chinensis</i>
นกแอ่นทุ่งเล็ก	<i>Glareola lactea</i>
นกยางลายเสื่อ	<i>Gorsachius melanolophus</i>
นกขุนทอง	<i>Gracula religiosa</i>
อีแร้งสีน้ำตาลหิมาลัย	<i>Gyps himalayensis</i>
นกกระแตใหญ่ ปีกสีน้ำตาล	<i>Halcyon amauroptera</i>
นกกระแตแดง	<i>Halcyon coromanda</i>
นกอินทรีหางขาว	<i>Haliaeetus albicilla</i>



**Table 6 Birds (Near Threatened-NT) (continue)**

นกออก	<i>Haliaeetus leucogaster</i>
นกขุนแผนตะโพกแดง	<i>Harpactes duvaucelii</i>
เหยี่ยวทองแดง	<i>Hieraaetus kienerii</i>
นกนางแอ่นผาสีคล้ำ	<i>Hirundo concolor</i>
นกนางแอ่นหางลวด	<i>Hirundo smithii</i>
นกอินทรีดำ	<i>Ictinaetus malayensis</i>
นกทืดทือพินธุ์มลายู	<i>Ketupa ketupa</i>
นกทืดทือพินธุ์เหนือ	<i>Ketupa zeylonensis</i>
ไก่อฟ้าพญาล่อ	<i>Lophura diardi</i>
ไก่อฟ้าหลังขาว	<i>Lophura nycthemera</i>
นกกินแมลงหัวแดงใหญ่	<i>Malacopteron magnum</i>
นกหัวขวานใหญ่สีเทา	<i>Mulleripicus pulverulentus</i>
นกจับแมลงสีน้ำตาลทองลาย	<i>Muscicapa williamsoni</i>
นกอีโกยตะโพกน้ำตาล	<i>Numenius madagascariensis</i>
นกโตคลื่นสีคล้ำ	<i>Oceanodroma monorhis</i>
นกขมิ้นหัวดำเล็ก	<i>Oriolus xanthonotus</i>
นกบั้งรอกเล็กทองแดง	<i>Phaenicophaeus sumatranus</i>
นกกาหน้าปากยาว	<i>Phalacrocorax fuscicollis</i>
นกจับแมลงออกแดง	<i>Philentoma velatum</i>
นกแต้วแล้วใหญ่หัวสีน้ำตาล	<i>Pitta oatesi</i>
นกกระจาบทอง	<i>Ploceus hypoxanthus</i>
นกกระจาบอกลาย	<i>Ploceus manyar</i>
นกกระจาบธรรมดา	<i>Ploceus philippinus</i>
นกอัญชันจีน	<i>Porzana paykullii</i>
นกแก้วหัวแพร	<i>Psittacula roseate</i>
นกปรอดหัวโขน	<i>Pycnonotus jocosus</i>
นกอัญชันป่าเขาเทา	<i>Rallina eurizonoides</i>
นกอัญชันป่าเขาแดง	<i>Rallina fasciata</i>
นกหัวขวานหลังสีส้ม	<i>Reinwardtipicus validus</i>
นกอีแพรดทองเหลือง	<i>Rhipidura hypoxantha</i>
นกจุดเด่นจิ๋วหางยาว	<i>Spelaeornis chocolatinus</i>
เหยี่ยวดำทองขาว	<i>Spizaetus alboniger</i>
เหยี่ยวภูเข	<i>Spizaetus nipalensis</i>
นกนางนวลแกลบเล็ก	<i>Sterna albifrons</i>
นกนางนวลแกลบคิ้วขาว	<i>Sterna anaethetus</i>
นกนางนวลแกลบ	<i>Sterna sumatrana</i>
ท้ายทอยดำ	
นกแซวสวรรค์หางดำ	<i>Terpsiphone atrocaudata</i>
นกเป็ดน้ำหางเข็ม	<i>Treron apicauda</i>
นกเป็ดน้ำอ้อมสีม่วงน้ำตาล	<i>Treron bicincta</i>
นกเป็ดน้ำหน้าเหลือง	<i>Treron pompadora</i>
นกกินแมลงสีน้ำตาลแดง	<i>Trichastoma bicolor</i>
นกกินแมลงป่าชายเลน	<i>Trichastoma rostratum</i>
นกแสก	<i>Tyto alba</i>
นกกระแตหัวเทา	<i>Vanellus cinereus</i>

**Table 7 Birds (Data Deficient-DD)**

นกพงใหญ่พันธุ์อินเดีย	<i>Acrocephalus stentoreus</i>
นกเขนน้ำเงิน	<i>Cinclidium frontale</i>
นกจาบปีกอ่อนนอกเหลือง	<i>Emberiza aureola</i>
นกอินทรีแถบปีกดำ	<i>Hieraaetus fasciatus</i>
นกยางไฟหัวเทา	<i>Ixobrychus eurhythmus</i>
นกเต่าลมแม่น้ำโขง	<i>Motacilla samveasnae</i>
นกกินแมลงเด็กแนน	<i>Stachyris rodolphei</i>
นกนางนวลแกลบหงอนใหญ่	<i>Sterna bergii</i>
นกคุ้มอืดเล็ก	<i>Turnix sylvatica</i>

**Table 8 Birds (Endemic)**

นกเจ้าฟ้าหญิงสิรินธร	<i>Pseudochelidon sirintarae</i>
นกกินแมลงเด็กแนน	<i>Stachyris rodolphei</i>

## Reptiles

For Reptiles, 1 species is extinct in thew (Table 1), 11 are critically endangered (Table 2), 5 (6 form) are endangered (Table 3), 16 are vulnerable (Table 4), 48 (50 form) are near threatened (Table 5), 183 (190 form) are least concern (Table 6), 89 are (92 form) data deficient (Table 7), 47 (49 form) are endemic (Table 8)

**Table 1 Reptile (Extinct in the Wild-EW)**

ตะโขง	<i>Tomistoma schlegelii</i>
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**Table 2 Reptiles (Critically Endangered-CR)**

เต่ากะอาน	<i>Batagur baska</i>
เต่าลายตีนเป็ด	<i>Callagur borneoensis</i>
เต่าตนุ	<i>Chelonia mydas</i>
ตะพาบมานลาย	<i>Chitra chitra</i>
ตะพาบมานลายพม่า	<i>Chitra vandijki</i>
จระเข้หน้าเค็ม	<i>Crocodylus porosus</i>
จระเข้หน้าจืด	<i>Crocodylus siamensis</i>
เต่ามะเฟือง	<i>Dermochelys coriacea</i>
เต่ากระ	<i>Eretmochelys imbricata</i>
เต่าหญ้า	<i>Lepidochelys olivacea</i>
ตะพาบหัวกบ	<i>Pelochelys cantorii</i>

**Table 3 Reptiles (Endangered-EN)**

เต่าเหลือง	<i>Indotestudo elongata</i>
เต่าหกเหลือง	<i>Manouria emys emys</i>



**Table 3 Reptiles (Endangered-EN) (continue)**

เต่าหกดำ	<i>Manouria emys phayrei</i>
เต่าเดือย	<i>Manouria impressa</i>
ตะกอก, ลั้ง	<i>Physignathus cocincinus</i>
เต่าปูลู	<i>Platysternon megacephalum</i>

**Table 4 Reptiles (Vulnerable-VU)**

ตะพาบธรรมดา	<i>Amyda cartilaginea</i>
เต่าหีบ	<i>Cuora amboinensis</i>
เต่าหวายทองเหลือง	<i>Cyclemys atripons</i>
เต่าใบไม้	<i>Cyclemys dentata</i>
เต่าใบไม้พม่า	<i>Cyclemys oldhami</i>
เต่าหวายคอลาย	<i>Cyclemys shanensis</i>
กิ้งก่าดงคิ้วสั้น	<i>Gonocephalus abbotti</i>
กิ้งก่าดงคอฟ้า	<i>Gonocephalus bellii</i>
กิ้งก่าดงใหญ่	<i>Gonocephalus grandis</i>
เต่าหวาย	<i>Heosemys grandis</i>
เต่าจักร	<i>Heosemys spinosa</i>
เต่าบัว	<i>Hieremys annandalei</i>
เต่านา	<i>Malayemys subtrijuga</i>
กิ้งก่าภูว	<i>Mantheyus phuwaensis</i>
เต่าทับทิม	<i>Notochelys platynota</i>
เต่าดำ	<i>Siebenrockiella crassicollis</i>

**Table 5 Reptiles (Near Threatened-NT)**

งูวงช้าง	<i>Acrochordus javanicus</i>
งูเขียวดงลาย	<i>Boiga sangsomi</i>
งูสามเหลี่ยมหัวแดง	<i>Bungarus flaviceps flaviceps</i>
งูพริกทองแดง	<i>Calliophis bivirgatus flaviceps</i>
งูพริกสีน้ำตาล	<i>Calliophis intestinalis lineata</i>
งูปล้องหวายหัวดำ	<i>Calliophis maculiceps</i>
งูเขียวรอน	<i>Chrysopelea paradisi paradisi</i>
งูดอกหมากแดง	<i>Chrysopelea pelias</i>
ตุ๊กแกป่าดงพญาเย็น	<i>Cyrtodactylus angularis</i>
ตุ๊กแกป่าโคนนิ้วติด	<i>Cyrtodactylus brevipalmatus</i>
ตุ๊กแกป่าสระบุรี	<i>Cyrtodactylus chanhomeae</i>
ตุ๊กแกป่าจารุจินต์	<i>Cyrtodactylus jarujini</i>
ตุ๊กแกป่าเขาชะเมา	<i>Cyrtodactylus sumonthai</i>
ตุ๊กแกป่าไทรโยค	<i>Cyrtodactylus tigroides</i>
จิ้งเหลนดงบังคั้งชัย	<i>Davewakeum miriamae</i>
ตะพาบดำ	<i>Dogania subplana</i>
งูปล้องฉนวนทุ่งสง	<i>Dryocalamus thungsongensis</i>
จิ้งเหลนหางสี่ฟ้า	<i>Eumeces quadrilineatus</i>
ตุ๊กแกสยาม	<i>Gekko siamensis</i>
จิ้งเหลนดงป่าตะวันตก	<i>Isopachys borealis</i>
จิ้งเหลนดงลาย	<i>Isopachys gyldenstolpei</i>
จิ้งเหลนดงชลบุรี	<i>Isopachys roulei</i>

**Table 5 Reptiles (Near Threatened-NT) (continue)**

แย้ใต้	<i>Leiolepis belliana belliana</i>
แย้เหนือ	<i>Leiolepis belliana ocellata</i>
แย้สงขลา	<i>Leiolepis bohmei</i>
แย้อีสาน	<i>Leiolepis reevesi rubritaeniata</i>
จิ้งเหลนภูเขาสามนิ้ว	<i>Leptoceps osellai</i>
งูปล้องฉนวนจันทบุรี	<i>Lycodon cadamomensis</i>
จิ้งเหลนเขียวจันทบุรี	<i>Lygosoma corpulentum</i>
จิ้งเหลนเขียวลาย	<i>Lygosoma haroldyoungi</i>
จิ้งเหลนเขียวภาคกลาง	<i>Lygosoma isodactylum</i>
จิ้งเหลนเขียวโคราช	<i>Lygosoma koratense</i>
กิ้งก่างู	<i>Ophisaurus gracilis</i>
งูลายสอลาวเหนือ	<i>Opisthotropis praemaxillaris</i>
งูลายสอสองสี	<i>Opisthotropis spenceri</i>
งูทางมะพร้าวแดงภูหลวง	<i>Oreophis porphyraceus coxi</i>
งูทางมะพร้าวแดง ลายขวัน	<i>Oreophis porphyraceus porphyraceus</i>
งูลายสอหมอบุญสง	<i>Parahelicops boonsongi</i>
กิ้งก่าหัวยาว	<i>Pseudocalotes floweri</i>
กิ้งก่าเขาสูง	<i>Pseudocalotes microlepis</i>
งูพงอหัวยาว	<i>Pseudorhabdion longiceps</i>
งูสิงทอง	<i>Ptyas fuscus</i>
จิ้งเหลนดินเกาะเต่า	<i>Scincella melanosticta kohtaoensis</i>
งูปล้องหวายลายขวันดำ	<i>Sinomicrurus macclelandi macclelandi</i>
งูเขียวหางไหม้สุมาตรา	<i>Trimeresurus (Parias) sumatranus</i>
งูปาล์ม	<i>Trimeresurus (Trimeresurus) borneensis</i>
งูเขียวตุ๊กแก	<i>Tropidolaemus wagleri</i>
ตุ๊กตุ๊ก	<i>Varanus dumerilii</i>
ตะกวด	<i>Varanus nubilosus</i>
เห่าซ่าง	<i>Varanus rudicollis</i>

**Table 6 Reptiles (Least Concern-LC)**

กิ้งก่าเขาหนามยาว	<i>Acanthosaura armata</i>
กิ้งก่าเขาหนามสั้น	<i>Acanthosaura crucigera</i>
กิ้งก่าเขาลี	<i>Acanthosaura lepidogaster</i>
งูผ้าขี้ริ้ว	<i>Acrochordus granulatus</i>
งูเขียวปากแหนบ	<i>Ahaetulla nasuta</i>
งูเขียวหัวจิ้งจกป่า	<i>Ahaetulla prasina</i>
งูลายสาบดอกหญ้า	<i>Amphiesma stolatum</i>
กิ้งก่าพระอินทร์	<i>Aphaniotis fusca</i>
งูกินทากหัวโหนด	<i>Aplopeltura boa</i>
งูกินทากเกล็ดเรียบ	<i>Asthenodipsas laevis</i>
งูกินทากมลายู	<i>Asthenodipsas malaccanus</i>
งูเขียวบอน	<i>Boiga cyanea</i>

Table 6 Reptiles (Least Concern-LC) (continue)

งูแส้วหางมา	<i>Boiga cynodon</i>
งูปล่องทอง	<i>Boiga dendrophila melanota</i>
งูดงคา	<i>Boiga drapiezii</i>
งูกระ	<i>Boiga jaspidea</i>
งูแม่ตะงาวรังนก	<i>Boiga multomaculata</i>
งูตองไฟ	<i>Boiga nigriceps</i>
งูแส้วหางมาเทา	<i>Boiga ocellata</i>
กิ้งก่าเขียวไต้	<i>Bronchocela cristatella</i>
กิ้งก่าเขียวจันทบูรณ	<i>Bronchocela smaragdina</i>
งูทับสมิงคลา	<i>Bungarus candidus</i>
งูสามเหลี่ยม	<i>Bungarus fasciatus</i>
งูพงอทองเหลือง	<i>Calamaria pavementata</i>
งูกะปะ	<i>Caloselasma rhodostoma</i>
กิ้งก่าแก้วเหนือ	<i>Calotes emma alticristata</i>
กิ้งก่าแก้วใต้	<i>Calotes emma emma</i>
กิ้งก่าสวน, กิ้งก่าหัวฟ้า	<i>Calotes mystaceus</i>
กิ้งก่าริ้ว, กิ้งก่าหัวแดง	<i>Calotes versicolor</i>
งูปากกว้างน้ำเค็ม	<i>Cerberus rynchops</i>
งูเขียวดอกหมาก	<i>Chrysopelea ornata ornatisissima</i>
จิ้งจกนิ้วยาวมลายู	<i>Cnemaspis affinis</i>
จิ้งจกนิ้วยาวจันทบุรี	<i>Cnemaspis chantaburiensis</i>
จิ้งจกนิ้วยาวหลังขีด	<i>Cnemaspis flavolineata</i>
จิ้งจกนิ้วยาวอินเดีย	<i>Cnemaspis kandianus</i>
จิ้งจกนิ้วยาวกัมพล	<i>Cnemaspis kumpoli</i>
จิ้งจกนิ้วยาวไทย	<i>Cnemaspis siamensis</i>
งูทางมะพร้าวดำ	<i>Coelognathus flavolineatus</i>
งูทางมะพร้าวลายขีด	<i>Coelognathus radiatus</i>
จิ้งจกหางแบนมลายู	<i>Cosymbotus craspedotus</i>
จิ้งจกบ้าน	<i>Cosymbotus platyurus</i>
งูถนน	<i>Cylindrophis ruffus</i>
ตุ๊กแกป่ามลายู	<i>Cyrtodactylus consobrinus</i>
ตุ๊กแกป่าหน้าหนาว	<i>Cyrtodactylus interdigitalis</i>
ตุ๊กแกป่าลายพาด	<i>Cyrtodactylus intermedius</i>
ป่าตะวันออก	
ตุ๊กแกป่าคอขั้ว	<i>Cyrtodactylus oldhami</i>
ตุ๊กแกป่าลายจุดผีเสื้อ	<i>Cyrtodactylus papilionoides</i>
ตุ๊กแกป่าลายจุดเหนือ	<i>Cyrtodactylus peguensis peguensis</i>
ตุ๊กแกป่าลายจุดใต้	<i>Cyrtodactylus peguensis zebraicus</i>
ตุ๊กแกป่าลายพาดป่าใต้	<i>Cyrtodactylus pulchellus</i>
ตุ๊กแกป่าลายสี่ขีด	<i>Cyrtodactylus quadrivirgatus</i>
ตุ๊กแกป่าพม่า	<i>Cyrtodactylus variegatus</i>
งูแมวเซา	<i>Daboia russelii siamensis</i>
จิ้งเหลนต้นไม้	<i>Dasia olivacea</i>
งูสายमानหลังลาย	<i>Dendrelaphis caudolineatus</i>

Table 6 Reptiles (Least Concern-LC) (continue)

งูสายमानฟ้าเขียว	<i>Dendrelaphis cyanochloris</i>
งูสายमानหลังทอง	<i>Dendrelaphis formosus</i>
งูสายमानพระอินทร์	<i>Dendrelaphis pictus</i>
งูสายमानเกล็ดไตดำใหญ่	<i>Dendrelaphis subocularis</i>
จิ้งจกดินลายจุด	<i>Dixoneus siamensis</i>
กิ้งก่าบินคอแดง	<i>Draco blanfordi</i>
กิ้งก่าบินคอสีส้ม	<i>Draco fimbriatus</i>
กิ้งก่าบินปีกแดง	<i>Draco haematopogon</i>
กิ้งก่าบินปีกส้มดอยสุเทพ	<i>Draco maculatus divergens</i>
กิ้งก่าบินปีกส้มจันทบูรณ	<i>Draco maculatus haasei</i>
กิ้งก่าบินปีกส้มมลายู	<i>Draco maculatus maculatus</i>
กิ้งก่าบินปีกส้มไหล่ดำ	<i>Draco maculatus whiteheadi</i>
กิ้งก่าบินคอดำ	<i>Draco melanopogon</i>
กิ้งก่าบินมลายู	<i>Draco obscurus formosus</i>
กิ้งก่าบินปีกหาแถบ	<i>Draco quinquefasciatus</i>
กิ้งก่าบินปีกลาย	<i>Draco taeniopterus</i>
กิ้งก่าบินคอสีฟ้า	<i>Draco volans sumatranus</i>
งูปล่องฉนวนอินเดีย	<i>Dryocalamus davisonii</i>
งูปล่องฉนวนมลายู	<i>Dryocalamus subannulatus</i>
งูเถา	<i>Dryophiops rubescens</i>
งูไซ	<i>Enhydris bocourti</i>
งูสายรุ้ง	<i>Enhydris enhydris</i>
งูปลิง	<i>Enhydris plumbea</i>
งูสายรุ้งลาย	<i>Enhydris subtaeniata</i>
งูกระดาง	<i>Erpeton tentaculatum</i>
จิ้งจกหินหางเรียว	<i>Gehyra angusticaudata</i>
จิ้งจกหินลายกระ	<i>Gehyra fehlmanni</i>
จิ้งจกหินเมืองกาญจน์	<i>Gehyra lacerata</i>
จิ้งจกหินสี่จาง	<i>Gehyra mutilata</i>
ตุ๊กแกบ้าน	<i>Gekko gecko</i>
ตุ๊กแกหลังจุดคู่	<i>Gekko monarchus</i>
ตุ๊กแกเขาหินทราย	<i>Gekko petricolus</i>
ตุ๊กแกสีเทา	<i>Gekko smithi</i>
งูสายทองคอแหวน	<i>Gongylosoma scriptus</i>
งูเขียวคาบหมาก	<i>Gonyosoma oxycephalum</i>
งูทางมะพร้าวเขียว	<i>Gonyosoma prasina</i>
จิ้งจกหางหนาม	<i>Hemidactylus frenatus</i>
จิ้งจกหางเรียบ	<i>Hemidactylus garnotii</i>
จิ้งจกเขาสูงมลายู	<i>Hemiphyllodactylus typus</i>
จิ้งจกเขาสูงยูนนาน	<i>Hemiphyllodactylus yunnanensis</i>
งูหัวกะโหลก	<i>Homalopsis buccata</i>
งูแสมรังทองเหลือง	<i>Hydrophis brookii</i>
จิ้งเหลนดวงประจวบ	<i>Isopachys anguinoides</i>
จิ้งเหลนลายอินโดจีน	<i>Lipinia vittigera</i>
งูสร้อยเหลือง	<i>Lycodon capucinus</i>
งูปล่องฉนวนแดง	<i>Lycodon effraensis</i>

Table 6 Reptiles (Least Concern-LC) (continue)

งูปล้องฉนวนเมืองเหนือ	<i>Lycodon fasciatus</i>
งูปล้องฉนวนลาว	<i>Lycodon laoensis</i>
งูปล้องฉนวนปาน	<i>Lycodon subcinctus</i>
จิ้งเหลนเรียวขาเล็ก	<i>Lygosoma quadrupes</i>
จิ้งเหลนหางยาว	<i>Mabuya longicaudata</i>
จิ้งเหลนหลากลาย มัลคอล์ม	<i>Mabuya macularia malcolmi</i>
จิ้งเหลนหลากลายสี่ขีด	<i>Mabuya macularia quadrifasciata</i>
จิ้งเหลนบ้าน	<i>Mabuya multifasciata</i>
จิ้งเหลนเกล็ดสั้น	<i>Mabuya novemcarinata</i>
จิ้งเหลนลายขีด	<i>Mabuya rugifera</i>
งูเห่าหม้อ	<i>Naja kaouthia</i>
งูเห่าสยาม	<i>Naja siamensis</i>
งูเห่าสุมาตรา	<i>Naja sumatrana</i>
งูบีแกวลายหัวใจ	<i>Oligodon barroni</i>
งูบีแกวภูหลวง	<i>Oligodon catenatus</i>
งูบีแกวลายกระ	<i>Oligodon cinereus</i>
งูบีแกวลายแต้ม	<i>Oligodon fasciolatus</i>
งูบีแกวสีจาง	<i>Oligodon inornatus</i>
งูบีแกวใหญ่	<i>Oligodon joynsoni</i>
งูกุด	<i>Oligodon purpurascens</i>
งูออดไทย	<i>Oligodon taeniatus</i>
งูจงอาง	<i>Ophiophagus hannah</i>
งูกาบหมากดำ	<i>Orthriophis taeniura ridleyi</i>
งูกาบหมากยูนนาน	<i>Orthriophis taeniura yunnanensis</i>
งูหางแหม่ภูเขา	<i>Ovophis monticola convictus</i>
งูกินทากเกล็ดสั้น	<i>Pareas carinatus</i>
งูกินทากจุดดำ	<i>Pareas macularius</i>
งูกินทากจุดขาว	<i>Pareas margaritophorus</i>
งูชายธงหลังดำ	<i>Pelamis platura</i>
งูหัวลายศร	<i>Plagiopholis nuchalis</i>
งูหมอก	<i>Psammodynastes pulverulentus</i>
งูมานทอง	<i>Psammophis indochinensis</i>
งูลายสาบตาโต	<i>Pseudoxenodon macrops</i>
งูสิงหาคดำ	<i>Ptyas carinatus</i>
งูสิงขาน	<i>Ptyas korros</i>
งูสิงหาลาย	<i>Ptyas mucosus</i>
ตุ๊กแกบินหางแบน	<i>Ptychozoon kuhli</i>
ตุ๊กแกบินหางหยัก	<i>Ptychozoon lionatum</i>
งูหลามปากเปิด	<i>Python brongersmai</i>
งูหลาม	<i>Python molurus bivittatus</i>
งูเหลือม	<i>Python reticulatus</i>
งูดินหัวขาว	<i>Ramphotyphlops albiceps</i>
งูดินบ้าน	<i>Ramphotyphlops braminus</i>

Table 6 Reptiles (Least Concern-LC) (continue)

งูลายสาบจุดดำขาว	<i>Rhabdophis chrysargos</i>
งูลายสาบเขียวขวันดำ	<i>Rhabdophis nigrocinctus</i>
งูลายสาบคอแดง	<i>Rhabdophis subminiatus subminiatus</i>
จิ้งเหลนเรียวท้องเหลือง	<i>Riopa bowringi</i>
จิ้งเหลนเรียวไต	<i>Riopa herberti</i>
จิ้งเหลนดินดอร์เรีย	<i>Scincella doriae</i>
จิ้งเหลนดินจุดดำ	<i>Scincella melanosticta melanosticta</i>
จิ้งเหลนดินดงพญาเย็น	<i>Scincella reevesi</i>
จิ้งเหลนดินเมืองกาญจน์	<i>Scincella tavesae</i>
งูคอขวันดำ	<i>Sibynophis collaris</i>
งูคอขวันหัวดำ	<i>Sibynophis melanocephalus</i>
งูคอขวันหัวลาย	<i>Sibynophis triangularis</i>
สามเหลี่ยม	
งูลายสอจีน	<i>Sinonatrix percarinata</i>
จิ้งเหลนภูเขาอินเดีย	<i>Sphenomorphus indicus indicus</i>
จิ้งเหลนภูเขาเกล็ดเรียบ	<i>Sphenomorphus maculatus</i>
จิ้งเหลนภูเขาสีจาง	<i>Sphenomorphus tersus</i>
กิ้งก่าหนอยหางยาว	<i>Takydromus sexlineatus ocellatus</i>
งูเขี้ยวหางไหม้ท้องเหลือง	<i>Trimeresurus (Cryptelytrops) albolabris albolabris</i>
งูหางแหม่กาญจน์	<i>Trimeresurus (Cryptelytrops) kanburiensis</i>
งูเขี้ยวหางไหม้ตาโต	<i>Trimeresurus (Cryptelytrops) macrops</i>
งูพังกา	<i>Trimeresurus (Cryptelytrops) purpureomaculatus</i>
งูเขี้ยวหางไหม้ทุ่งสง	<i>Trimeresurus (Cryptelytrops) venustus</i>
งูเขี้ยวหางไหม้อาเจิน	<i>Trimeresurus (Pareas) hageni</i>
งูเขี้ยวหางไหม้ ท้องเขียวไต	<i>Trimeresurus (Popeia) fugatus</i>
งูเขี้ยวหางไหม้ ท้องเขียวมลายู	<i>Trimeresurus (Popeia) nebularis</i>
งูเขี้ยวหางไหม้ ท้องเขียวเหนือ	<i>Trimeresurus (Popeia) popeiorum</i>
งูเขี้ยวไฟ	<i>Trimeresurus (Viridovipera) gumprechtii</i>
งูเขี้ยวหางเทา	<i>Trimeresurus (Viridovipera) vogeli</i>
จิ้งเหลนห้วยท้องแดง	<i>Tropidophorus berdmorei</i>
จิ้งเหลนห้วยลาว	<i>Tropidophorus laotus</i>
จิ้งเหลนห้วยเล็ก	<i>Tropidophorus microlepis</i>
จิ้งเหลนห้วยชุมพร	<i>Tropidophorus robinsoni</i>

**Table 6 Reptiles (Least Concern-LC) (continue)**

จิ้งเหลนห้วยไทย	<i>Tropidophorus thai</i>
งูดินใหญ่อินโดจีน	<i>Typhlops diardi</i>
งูดินหัวเหลือง	<i>Typhlops floweri</i>
งูดินโคราช	<i>Typhlops khoratensis</i>
งูดินใหญ่มลายู	<i>Typhlops muelleri</i>
งูดินดอยปู่	<i>Typhlops porrectus</i>
งูดินปักธงชัย	<i>Typhlops ozakiae</i>
เหี้ย	<i>Varanus salvator</i>
งูควนขนุน	<i>Xenelaphis hexagonotus</i>
งูลายสอสวน	<i>Xenochrophis flavipunctatus</i>
งูลายสอใหญ่	<i>Xenochrophis piscator</i>
งูลายสอพมา	<i>Xenochrophis punctulatus</i>
งูลายสอลายสามเหลี่ยม	<i>Xenochrophis trianguligerus</i>
งูแสงอาทิตย์	<i>Xenopeltis unicolor</i>

**Table 7 Reptiles (Data Deficient-DD)**

งูทากลายทองขาว	<i>Acalyptophis peronii</i>
ตุ๊กแกหัวโต	<i>Aeluroscalabotes felinus</i>
งูเขี้ยวหัวลายกระ	<i>Ahaetulla fasciolata</i>
งูเขี้ยวหัวจิ้งจกมลายู	<i>Ahaetulla mycterizans</i>
งูชายธงนวล	<i>Aipysurus eydouxii</i>
งูลายสาบยูนนาน	<i>Amphiesma bitaeniatum</i>
งูลายสาบทองสามขีด	<i>Amphiesma deschaunseei</i>
งูลายสาบท่าสาร	<i>Amphiesma groundwateri</i>
งูลายสาบมลายู	<i>Amphiesma inas</i>
งูลายสาบเขาสูง	<i>Amphiesma khasiense</i>
งูทากลาย	<i>Astrotia stokesii</i>
งูปากกว้างทองสั้น	<i>Bitia hydroides</i>
งูฟงอ้อหลากลาย	<i>Calamaria lumbricoidea</i>
งูฟงอ้อหัวแดง	<i>Calamaria schlegeli</i>
งูปล่องหวายมลายู	<i>Calliophis gracilis</i>
งูปากกว้างลาย	<i>Cantoria violacea</i>
เต่าหัวโต	<i>Caretta caretta</i>
จิ้งจกนิ้วยาวภูเก็ต	<i>Cnemaspis phuketensis</i>
ตุ๊กแกปากำธร, ตุ๊กแกป่าสุราษฎร์	<i>Cyrtodactylus thirakhupti</i>
งูสายमानอันนัม	<i>Dendrelaphis ngansaoensis</i>
งูสายमानลายเฉียง	<i>Dendrelaphis striatus</i>
จิ้งเหลนดวงสีม่วง	<i>Dibamus alfredi</i>
จิ้งเหลนดวงเขาสอยดาว	<i>Dibamus somsaki</i>
งูปล่องฉนวนภูเขา	<i>Dinodon septentrionale</i>
จิ้งจกดินหางสีส้ม	<i>Dixoneus hangseesom</i>
จิ้งจกดินข้างดำ	<i>Dixoneus melanostictus</i>
งูคออ่อนปากจะงอย	<i>Enhydrina schistosa</i>
งูสายรุ่งดำ	<i>Enhydris jagorii</i>
งูปลาหัวเทา	<i>Fordonia leucobalia</i>
งูปลาตาแมว	<i>Gerarda prevostiana</i>

**Table 7 Reptiles (Data Deficient-DD) (continue)**

งูสายทองลายแถบ	<i>Gongylosoma baliodeirus baliodeirus</i>
งูสายทองจันทบุรี	<i>Gongylosoma baliodeirus cochranae</i>
งูสายทองหางยาว	<i>Gongylosoma longicauda</i>
งูกาบหมากมลายู	<i>Gonyosoma floweri</i>
งูหัวกะโหลกทองดำ	<i>Homalopsis nigroventralis</i>
งูแสมรังหัวดำ	<i>Hydrophis atriceps</i>
งูแสมรังเกล็ดเบลเซอร์	<i>Hydrophis belcheri</i>
งูแสมรังเกล็ดสองตุ่ม	<i>Hydrophis bituberculatus</i>
งูแสมรังลายเยื้อง	<i>Hydrophis caeruleus</i>
งูแสมรังแคนเทอร์	<i>Hydrophis cantoris</i>
งูแสมรังเหลืองลายคราม	<i>Hydrophis cyanocinctus</i>
งูแสมรังหัวดำ	<i>Hydrophis fasciatus</i>
งูคออ่อนหัวเข็ม	<i>Hydrophis gracilis</i>
งูฝักมะรุ้ม	<i>Hydrophis klossi</i>
งูแสมรังแลมเบิร์ต	<i>Hydrophis lamberti</i>
งูแสมรังอ่าวเปอร์เซีย	<i>Hydrophis lapemoides</i>
งูแสมรังดำ	<i>Hydrophis melanosoma</i>
งูแสมรังหางขาว	<i>Hydrophis ornatus ornatus</i>
งูแสมรังลายเหลือง	<i>Hydrophis spiralis</i>
งูแสมรังมลายู	<i>Hydrophis torquatus aagaardi</i>
งูแสมรังเทา	<i>Hydrophis torquatus diadema</i>
งูชายธงขาวหลามตัด	<i>Kerilia jerdonii jerdonii</i>
งูชายธงสยาม	<i>Kerilia jerdonii siamensis</i>
งูชายธงหัวโต	<i>Kolpophis annandalei</i>
งูอายุจั่ว	<i>Lapemis curtus</i>
งูสมิงทะเลเหลือง	<i>Laticauda colubrina</i>
งูสมิงทะเลปากดำ	<i>Laticauda laticaudata</i>
งูปล่องฉนวนมลายู	<i>Lepturophis albofuscus</i>
งูสายทองมลายู	<i>Liopeltis tricolor</i>
จิ้งเหลนลายสี่ขีด	<i>Lipinia quadrivittata</i>
จิ้งเหลนลายมลายู	<i>Lipinia surda</i>
งูปล่องฉนวนทุ่งสง	<i>Lycodon butleri</i>
จิ้งเหลนเรียวกพมา	<i>Lygosoma anguinum</i>
จิ้งเหลนหลากลาย ดานชาย	<i>Mabuya macularia postnasalis</i>
งูฟงอ้อภูเขา	<i>Macrocalamus lateralis</i>
งูรังแหหัวแดง	<i>Macropisthodon flaviceps</i>
งูรังแหหลังศร	<i>Macropisthodon rhodomelas</i>
งูบีแก้วลายขีด	<i>Oligodon dorsolateralis</i>
งูอดเขมร	<i>Oligodon mouhoti</i>
งูกินทากลายขั้ว	<i>Pareas hamptoni</i>
ตุ๊กแกบินหางเฟิน	<i>Ptychozoon horsfieldi</i>
ตุ๊กแกบินลายสามแถบ	<i>Ptychozoon trinotatera</i>
เต่าจัน	<i>Pyxidea mouhoti</i>
งูดินลายขีด	<i>Ramphotyphlops lineatus</i>



**Table 7 Reptiles (Data Deficient-DD) (continue)**

งูลายสาบยูนิคาน	<i>Rhabdophis subminiatus helleri</i>
จิ้งเหลนภูเขาหมอลาย	<i>Sphenomorphus butleri</i>
จิ้งเหลนภูเขาแกรนดิสัน	<i>Sphenomorphus grandisonae</i>
จิ้งเหลนภูเขาเฮเลน	<i>Sphenomorphus helenae</i>
จิ้งเหลนภูเขาอุบล	<i>Sphenomorphus lineopunctulatus</i>
จิ้งเหลนภูเขาเล็ก	<i>Sphenomorphus mimicus</i>
จิ้งเหลนภูเขาลายกระ	<i>Sphenomorphus praesignis</i>
จิ้งเหลนภูเขาลายแฉก	<i>Sphenomorphus scotophilus</i>
จิ้งเหลนภูเขาจุดดาว	<i>Sphenomorphus stellatus</i>
งูแดงบอร์เนียว	<i>Stegonotus borneensis</i>
งูชายธงทองขาว	<i>Thalassophina viperina</i>
งูเสมีนรังหัวสั้น	<i>Thalassophis anomalus</i>
จิ้งเหลนห้วยภูวาวัว	<i>Tropidophorus laticutatus</i>
จิ้งเหลนห้วยภูผาน้ำทิพย์	<i>Tropidophorus matsuii</i>
งูดินกรุงเทพ	<i>Typhlops roxanae</i>
งูดินสยาม	<i>Typhlops siamensis</i>
งูดินตรัง	<i>Typhlops trangensis</i>
งูทองขาว	<i>Xenodermus javanicus</i>

**Table 8 Reptiles (Endemic)**

งูลายสาบท้องสามขีด	<i>Amphiesma deschaunseei</i>
งูลายสาบท่าสาร	<i>Amphiesma groundwateri</i>
งูเขี้ยวตงลาย	<i>Boiga sangsomi</i>
จิ้งจกนิ้วยาวจันทบุรี	<i>Cnemaspis chantaburiensis</i>
จิ้งจกนิ้วยาวภูเก็ต	<i>Cnemaspis phuketensis</i>
ตุ๊กแกป่าดงพญาเย็น	<i>Cyrtodactylus angularis</i>
ตุ๊กแกป่าโคนนิ้วติด	<i>Cyrtodactylus brevipalmatus</i>
ตุ๊กแกป่าสระบุรี	<i>Cyrtodactylus chanhomeae</i>
ตุ๊กแกป่าลายจุดใต้	<i>Cyrtodactylus peguensis zebraicus</i>
ตุ๊กแกป่าเขาชะเมา	<i>Cyrtodactylus sumonthai</i>
ตุ๊กแกป่ากำธร, ตุ๊กแกป่าสุราษฎร์	<i>Cyrtodactylus thirakhupti</i>
ตุ๊กแกป่าไทรโยค	<i>Cyrtodactylus tigroides</i>
จิ้งจกดินหางสีส้ม	<i>Dixoneus hangseesom</i>
จิ้งจกดินข้างดำ	<i>Dixoneus melanostictus</i>
งูปล้องฉนวนทุ่งสง	<i>Dryocalamus thungsongensis</i>
จิ้งจกหินหางเรียวยาว	<i>Gehyra angusticaudata</i>
จิ้งจกหินลายกระ	<i>Gehyra fehlmanni</i>
จิ้งจกหินเมืองกาญจน์	<i>Gehyra lacerata</i>
ตุ๊กแกสยาม	<i>Gekko siamensis</i>
งูสายทองจันทบุรี	<i>Gongylosoma baliodeirus cochranae</i>
จิ้งเหลนตัวงประจวบ	<i>Isopachys anguinoides</i>
จิ้งเหลนตัวงลาย	<i>Isopachys gyldenstolpei</i>

**Table 8 Reptiles (Endemic) (continue)**

จิ้งเหลนตัวงชลบุรี	<i>Isopachys roulei</i>
จิ้งเหลนภูเขาสามนิ้ว	<i>Leptoceps osellai</i>
จิ้งเหลนเรียวยาว	<i>Lygosoma haroldyoungi</i>
จิ้งเหลนเรียวยาวโคราช	<i>Lygosoma koratense</i>
จิ้งเหลนหลากลาย มัลคอล์ม	<i>Mabuya macularia malcolmi</i>
จิ้งเหลนหลากลาย ด่านซ้าย	<i>Mabuya macularia postnasalis</i>
จิ้งเหลนหลากลายสี่ขีด	<i>Mabuya macularia quadrifasciata</i>
งูทางมะพร้าวแดงภูหลวง	<i>Oreophis porphyraceus coxi</i>
จิ้งเหลนเรียวยาวโต	<i>Riopa herberti</i>
จิ้งเหลนดินเกาะเต่า	<i>Scincella melanosticta kohtaoensis</i>
จิ้งเหลนดินเมืองกาญจน์	<i>Scincella tavesae</i>
งูคอขั้วหัวลาย สามเหลี่ยม	<i>Sibynophis triangularis</i>
จิ้งเหลนภูเขาแกรนดิสัน	<i>Sphenomorphus grandisonae</i>
จิ้งเหลนภูเขาเฮเลน	<i>Sphenomorphus helenae</i>
จิ้งเหลนภูเขาอุบล	<i>Sphenomorphus lineopunctulatus</i>
จิ้งเหลนภูเขาเล็ก	<i>Sphenomorphus mimicus</i>
จิ้งเหลนภูเขาสี่ข้าง	<i>Sphenomorphus tersus</i>
งูหางแห่มกาญจน์	<i>Trimeresurus (Cryptelytrops) kanburiensis</i>
จิ้งเหลนห้วยภูวาวัว	<i>Tropidophorus laticutatus</i>
จิ้งเหลนห้วยภูผาน้ำทิพย์	<i>Tropidophorus matsuii</i>
จิ้งเหลนห้วยไทย	<i>Tropidophorus thai</i>
งูดินหัวเหลือง	<i>Typhlops floweri</i>
งูดินโคราช	<i>Typhlops khoratensis</i>
งูดินปักธงชัย	<i>Typhlops ozakiae</i>
งูดินกรุงเทพฯ	<i>Typhlops roxanae</i>
งูดินสยาม	<i>Typhlops siamensis</i>
งูดินตรัง	<i>Typhlops trangensis</i>

## Amphibiens

For Amphibiens, 5 species are vulnerable (Table 1), 33 are near threatened (Table 2), 64 (65 form) are least concern (Table 3), 35 are data deficient (Table 4), 7 are endemic (Table 5).

**Table 1 Amphibiens (Vulnerable-VU)**

กบอกหนามเหนือ	<i>Paa bourreti</i>
กบอกหนามจันทบุรี	<i>Paa fasciculispina</i>
ปาดตะป่อมใหญ่	<i>Theloderma gordonii</i>



**Table 1 Amphibiens (Vulnerable-VU) (continue)**

ปาดตะปุมมลายู	<i>Theلودerma horridum</i>
ปาดตะปุมจันทบุรี	<i>Theلودerma stellatum</i>

**Table 2 Amphibiens (Near Threatened-NT)**

คางคกห้วยอินทนนท์	<i>Ansonia inthanon</i>
คางคกห้วยไทย	<i>Ansonia siamensis</i>
กบเกาะช้าง	<i>Bourettia kohchangae</i>
อึ่งกรายข้างแถบ	<i>Brachytarsophrys carinense</i>
อึ่งเพ้า, อึ่งปากขวด	<i>Glyphoglossus molossus</i>
กบทาสาร	<i>Ingerana tasanae</i>
กบตะนาวศรี	<i>Ingerana tenasserimensis</i>
อึ่งอ่างก้นขีด	<i>Kaloula mediolineata</i>
กบทูด, เขียดแลว	<i>Limnonectes blythii</i>
กบห้วยขาปุม, กบมีน	<i>Limnonectes kuhlii</i>
กบทูดมลายู	<i>Limnonectes malesianus</i>
กบป่าพรุ	<i>Limnonectes paramacrodon</i>
อึ่งกรายหัวแหลม	<i>Megophrys nasuta</i>
อึ่งกรายปากแคบ	<i>Ophryophryne microstoma</i>
กบภูหลวง	<i>Rana chapaensis</i>
กบเขาสอยดาว	<i>Rana faber</i>
กบหลังไพล, เขียดเหลือ้ง	<i>Rana lateralis</i>
กบสังขละ	<i>Rana leptoglossa</i>
กบหลังลายเฉียง	<i>Rana miopus</i>
กบหลังจุด	<i>Rana signata</i>
ปาดดอยอินทนนท์	<i>Rhacophorus feae</i>
ปาดยักษ์	<i>Rhacophorus maximus</i>
ปาดเขี้ยวตีนดำ	<i>Rhacophorus nigropalmatus</i>
ปาดตีนแดง	<i>Rhacophorus pardalis</i>
ปาดเขี้ยวตีนแดง	<i>Rhacophorus prominanus</i>
ปาดเขี้ยวตีนลาย	<i>Rhacophorus reinwardtii</i>
ปาดขาลาย	<i>Rhacophorus robinsoni</i>
กะท่าง	<i>Tylototriton verrucosus</i>
อึ่งกรายหัวมน	<i>Xenophrys aceras</i>
อึ่งกรายขายาว	<i>Xenophrys longipes</i>
อึ่งกรายห้วยใหญ่	<i>Xenophrys major</i>
อึ่งกรายแคระ	<i>Xenophrys minor</i>
อึ่งกรายเล็ก	<i>Xenophrys parva</i>

**Table 3 Amphibiens (Least Concern-LC)**

กบลายหินเมืองใต้	<i>Amolops larutensis</i>
กบลายหินเมืองเหนือ	<i>Amolops marmoratus</i>
คางคกห้วยมลายู	<i>Ansonia malayana</i>
จงโคร่ง	<i>Bufo asper</i>
คางคกแคระมลายู	<i>Bufo divergens</i>
คางคกหัวราบ	<i>Bufo macrotis</i>
คางคกบาน	<i>Bufo melanostictus</i>

**Table 3 Amphibiens (Least Concern-LC) (continue)**

คางคกแคระอินโดจีน	<i>Bufo parvus</i>
อึ่งลาย	<i>Calluella guttulata</i>
ปาดจิวหลังขีด	<i>Chirixalus doriae</i>
ปาดจิวลายแต้ม	<i>Chirixalus nongkhorensis</i>
ปาดจิวพม่า	<i>Chirixalus vittatus</i>
กบน้ำเค็ม	<i>Fejervarya cancrivora</i>
กบนา	<i>Hoplobatrachus chinensis</i>
อึ่งปุมหลังลาย	<i>Kalophrynus interlineatus</i>
อึ่งปุมมลายู	<i>Kalophrynus pleurostigma</i>
อึ่งอ่างมลายู	<i>Kaloula baleata</i>
อึ่งอ่างบาน	<i>Kaloula pulchra</i>
อึ่งกรายลายจุด	<i>Leptobranchium hendricksoni</i>
อึ่งกรายลายเลอะ	<i>Leptobranchium smithi</i>
อึ่งกรายหลากลาย	<i>Leptolalax heteropus</i>
อึ่งกรายหนังปุม	<i>Leptolalax pelodytoides</i>
คางคกขายาว	<i>Leptophryne borbonica</i>
กบหงอน	<i>Limnonectes gyldenstolpei</i>
กบหลังตาพับ	<i>Limnonectes laticeps</i>
กบหัวโต	<i>Limnonectes macrognathus</i>
กบแรด	<i>Limnonectes plicatellus</i>
อึ่งแม่นาว	<i>Microhyla berdmorei</i>
อึ่งลายแต้ม	<i>Microhyla butleri</i>
อึ่งข้างดำ	<i>Microhyla heymonsi</i>
อึ่งน้ำเต้า	<i>Microhyla ornata</i>
อึ่งขาคว่ำ	<i>Microhyla pulchra</i>
อึ่งหลังจุด	<i>Micryletta inornata inornata</i>
อึ่งหลังขีด	<i>Micryletta inornata lineata</i>
ปาดป่าจุดขาว	<i>Nyctixalus pictus</i>
เขียดลิ้น	<i>Occidozyga laevis</i>
เขียดจะนา	<i>Occidozyga lima</i>
เขียดหลังปุม	<i>Occidozyga magnapustulosa</i>
เขียดทราย	<i>Occidozyga martensii</i>
คางคกต้นไม้	<i>Pedostibes hosii</i>
ปาดแคระป่า	<i>Philautus parvulus</i>
ปาดแคระทองเหลือ้ง	<i>Philautus petersi</i>
ปาดนิ้วแยกมลายู	<i>Polypedates colleti</i>
ปาดบาน	<i>Polypedates leucomystax</i>
ปาดหูดำ	<i>Polypedates macrotis</i>
เขียดตะปาด	<i>Polypedates mutus</i>
กบชะง่อนผาอินทนนท์	<i>Rana archotaphus</i>
กบว่ากเล็ก	<i>Rana baramica</i>
กบเขาสูง	<i>Rana cf. alticola</i>
กบหูดำ	<i>Rana cubitalis</i>
เขียดจิก	<i>Rana erythraea</i>
กบว่ากใหญ่	<i>Rana glandulosa</i>
กบชะง่อนผาใต้	<i>Rana hosii</i>
กบสีชมพู	<i>Rana johnsi</i>

**Table 3 Amphibiens (Least Concern-LC) (continue)**

กบชะง่อนผาเหนือ	<i>Rana livida</i>
กบหลังขีต	<i>Rana macrodactyla</i>
กบนิโคบาร์	<i>Rana nicobariensis</i>
กบอองเล็ก	<i>Rana nigrovittata</i>
กบเขาหลังตอง	<i>Rana raniceps</i>
กบใต้หวั่น	<i>Rana taipehensis</i>
ปาดลายเลอะไต	<i>Rhacophorus appendiculatus</i>
ปาดตีนเหลือง	<i>Rhacophorus bipunctatus</i>
ปาดลายเลอะอิสาน	<i>Rhacophorus bisacculus</i>
ปาดจุดฟ้า	<i>Rhacophorus cyanopunctatus</i>
ปาดตะปุ่มเล็ก	<i>Theلودerma asperum</i>

**Table 4 Amphibiens (Data Deficient-DD)**

อึ่งกรายพม่า	<i>Brachytarsophrys feae</i>
เขียดจุมมลายู	<i>Caudacaecilia asplenia</i>
เขียดจูดำ, เขียดจุมบาลา	<i>Caudacaecilia larutensis</i>
กบดอยซาง	<i>Chaparana aenea</i>
อึ่งทองเหลือง	<i>Chaperina cf. fusca</i>
ปาดจิวตะวันออก	<i>Chirixalus hansenae</i>
กบหนอง	<i>Fejervarya limnocharis</i>
กบรายา	<i>Fejervarya raja</i>
กบชะง่อนผาไทย	<i>Huia melasma</i>
ปาดเมืองจีน	<i>Hyla annectans</i>
เขียดงูหัวแหลม	<i>Ichthyophis acuminatus</i>
เขียดงูเกาะเต่า	<i>Ichthyophis kohtaoensis</i>
เขียดงูศุภชัย	<i>Ichthyophis supachaii</i>
เขียดงูดอยสุเทพ	<i>Ichthyophis youngorum</i>
อึ่งกรายตาขาว	<i>Leptobranchium chapaense</i>
อึ่งกรายลาย ดอยอินทนนท์	<i>Leptolalax bourreti</i>
อึ่งกรายลายทองผาภูมิ	<i>Leptolalax cf. gracilis</i>
กบดอร์เรีย	<i>Limnonectes doriae</i>
อึ่งอันนัม	<i>Microhyla annamensis</i>
อึ่งน้ำเต้ามลายู	<i>Microhyla annectans</i>
อึ่งบอร์เนียว	<i>Microhyla borneensis</i>
ปาดแคระพม่า	<i>Philautus carinensis</i>
ปาดแคระขาเรียว	<i>Philautus gracilipes</i>
ปาดแคระทองลาย	<i>Philautus vermiculatus</i>
อึ่งทองแดง	<i>Phrynella pulchra</i>
กบหลังจูดมลายู	<i>Rana banjarana</i>
กบชะง่อนผาอิสลัม	<i>Rana chloronota</i>
กบเขาทองลาย	<i>Rana luctuosa</i>
กบเขาใหญ่	<i>Rana milleti</i>
กบอองใหญ่	<i>Rana mortenseni</i>
กบดอยอินทนนท์	<i>Rana schmackeri</i>
ปาดตีนเหลืองอิสาน	<i>Rhacophorus orlovi</i>
ปาดลายเลอะเหนือ	<i>Rhacophorus verrucosus</i>

**Table 4 Amphibiens (Data Deficient-DD) (continue)**

กบป่าไผ่	<i>Taylorana hascheana</i>
กบกา	<i>Taylorana limburgii</i>

**Table 5 Amphibiens (Endemic)**

คางคกหัวอินทนนท์	<i>Ansonia inthanon</i>
คางคกหัวไทย	<i>Ansonia siamensis</i>
กบชะง่อนผาไทย	<i>Huia melasma</i>
เขียดงูหัวแหลม	<i>Ichthyophis acuminatus</i>
เขียดงูเกาะเต่า	<i>Ichthyophis kohtaoensis</i>
เขียดงูดอยสุเทพ	<i>Ichthyophis youngorum</i>
กบทาสาร	<i>Ingerana tasanai</i>

## Fishes

For Fishes, 3 species are extinct (Table 1), 18 are critically endangered (Table 2), 42 are endangered (Table 3), 155 are vulnerable (Table 4), 20 are near threatened (Table 5), 11 are threatened *in situ* (Table 6), 30 are data deficient (Table 7), 72 are endemic (Table 8).

**Table 1 Fishes (Extinct-EX)**

หางไหม้, หางเหยี่ยว	<i>Balantiocheilos cf. melanopterus</i>
เสือดอ	<i>Datnioides pulcher</i>
สายยู, หวีเกศ, เกด	<i>Platytrapius siamensis</i>

**Table 2 Fishes (Critically Endangered-CR)**

สนากยักษ์	<i>Aptosyax grypus</i>
ฉนากจระเขยแคบ	<i>Anoxypristis cuspidata</i>
กัตกระปี่	<i>Betta simplex</i>
กัตมหาชัย	<i>Betta sp.</i>
เกด	<i>Ceratoglanis pachynema</i>
คอหน้าหัก	<i>Ellopostoma mystax</i>
ทรงเครื่อง, ฉลามหางแดง	<i>Epalzeorhynchus bicolor</i>
ทองพลู	<i>Laubuca mouhoti</i>
คอตาบอด, ค้อถ้ำ	<i>Nemacheilus trogocataractus</i>
บัว	<i>Osteochilus schlegeli</i>
ปึก	<i>Pangasianodon gigas</i>
ฉนากยักษ์	<i>Pristis microdon</i>
ฉนากฟันเล็ก	<i>Pristis pectinata</i>
ฉนากเขี้ยว	<i>Pristis zijson</i>
โรนิน, กระเบนท้องน้ำ	<i>Rhina ancylostoma</i>
คอจากรูธานีรินทร์	<i>Schistura jaruthanini</i>
ชีวมพงษ์	<i>Trigonostigma somphongsi</i>
หมูอารีย์	<i>Yasuhikotakia sidthimunki</i>

Table 3 Fishes (Endangered-EN)

ขยุยักษ์พรมพิราม	<i>Acrochordonichthys gyrinus</i>
ขยุยักษ์แมกกรอง	<i>Acrochordonichthys septemtrionalis</i>
ตะโกกหน้าสั้น	<i>Albulichthys albuloides</i>
นกแก้วหัวค้อน	<i>Bolbometopon muricatum</i>
หมูฮ้องเต	<i>Botia rostrata</i>
กระโท	<i>Catlocarpio siamensis</i>
นกขุนทองหัวโหนก, นโปเลียน	<i>Cheilinus undulatus</i>
ทองลาย	<i>Chitala blanci</i>
สะตือ	<i>Chitala lopis</i>
กะรังนางอน	<i>Cromileptes altivelis</i>
เสือดอลายเล็ก	<i>Datnioides undecimradiatus</i>
ฉลามหัวค้อนยาว	<i>Eusphyrna blochi</i>
ติดหิน	<i>Exostoma labiatum</i>
ฉลามเสือ, ตะเพียนทอง	<i>Galeocерdo cuvier</i>
กตหัวผาน	<i>Hemiaris verrucosus</i>
กระเบนราหู, กระเบนน้ำจืดยักษ์	<i>Himantura chaophraya</i>
ปึกไก่หนวดยาว	<i>Kryptopterus dissitus</i>
ปึกไก่หนวดยาว	<i>Kryptopterus heperius</i>
ปึกไก่หนวดยาว	<i>Kryptopterus limpok</i>
ดาบลาว, ผักพรา	<i>Macrochirichthys macrochirus</i>
ปักเป้าขน	<i>Monotrete baileyi</i>
หนวดแมว	<i>Ompok eugeneiatus</i>
หนวดแมว	<i>Ompok pinnatus</i>
ติดหิน, คางคาว	<i>Oreoglanis siamensis</i>
เทพา	<i>Pangasius sanitwongsei</i>
เอ็นคางมุ่ม	<i>Probarbus labeamajor</i>
เอ็นฝ้าย	<i>Probarbus labeaminor</i>
ติดหินแผ่นทองหนา	<i>Pseudoecheineus sulcatus</i>
ชะโอนถ้ำ	<i>Pterocryptis buccata</i>
โรนัน, อีมุด	<i>Rhinobatos granulatus</i>
โรนันหัวใส	<i>Rhinobatos schlegelii</i>
อีมุด, อีมุด, โรนัน หัวจิ้งจก	<i>Rhinobatos thouini</i>
โรนันยักษ์	<i>Rhinobatos typus</i>
บู่หน้าตักเขียงใหม่	<i>Rhinogobius Chiangmaiensis</i>
กตหมุยักษ์	<i>Rita sacerdotum</i>
ตะพัด	<i>Scleropages formosus</i>
ฉลามหัวค้อน	<i>Sphyrna leweni</i>
ฉลามหัวค้อนยักษ์	<i>Sphyrna mokarran</i>
ตะลุมพุก	<i>Tenualosa macrura</i>
หมากผาง	<i>Tenualosa thibaudeaui</i>
ตะลุมพุก	<i>Tenualosa toil</i>
หมูนาน	<i>Yasuhikotakia nigrolineata</i>

Table 4 Fishes (Vulnerable-VU)

ขยุย	<i>Akysis leucorhynchus</i>
ดักแมกกรอง	<i>Amblyceps variegatum</i>
การตูน	<i>Amphiprion sebae</i>
กระเบนน้ำโขง	<i>Amphothistes laoensis</i>
ริวกิว, เลี้ยวเขียว, กต	<i>Arius thalassina</i>
หว่าหนานอ	<i>Bangana behri</i>
หว่าหนานอ	<i>Bangana devdevi</i>
หว่าหนานอแมกกรอง	<i>Bangana sp.</i>
กตยืม, กตหัวกบ	<i>Batrachoccephalus mino</i>
หมोज้าปา	<i>Belontia hasselti</i>
กัตน้ำแดง	<i>Betta pi</i>
กัตภูเขาตะวันออก	<i>Betta prima</i>
ชีวเพชรน้อย	<i>Boraras maculata</i>
ชีวแคะสามจุด	<i>Boraras micros</i>
ชีวแคะ	<i>Boraras urophthalmoides</i>
กัตทะเลดำจุดขาว	<i>Calloplelesops altivelis</i>
ฉลามปลายครีบขาว	<i>Carcharhinus albimarginatus</i>
ฉลามจ้าวมัน	<i>Carcharhinus amblyrhynchoides</i>
ฉลามครีบดำใหญ่	<i>Carcharhinus amblyrhynchos</i>
ฉลามตาเล็ก	<i>Carcharhinus amboinensis</i>
ฉลามหนู	<i>Carcharhinus borneensis</i>
ฉลามครีบดำ	<i>Carcharhinus brachyurus</i>
ฉลามหัวบาตร	<i>Carcharhinus leucas</i>
ฉลามครีบดำเล็ก	<i>Carcharhinus limbatus</i>
ฉลามหูดำ	<i>Carcharhinus melanopterus</i>
ฉลามเทา	<i>Carcharhinus obscurus</i>
ฉลามกระโดงสูง	<i>Carcharhinus plumbeus</i>
ฉลามหนู	<i>Carcharhinus sealei</i>
ฉลามหนูหัวแหลม	<i>Carcharhinus sorrah</i>
ฉลามทราย	<i>Carcharius taurus</i>
กะมะ	<i>Chaca bangkanensis</i>
ฉลามหิน	<i>Chiloscyllium plagiosum</i>
นวลจันทร์	<i>Cirrhinus macrosemion</i>
นวลจันทร์น้ำจืด	<i>Cirrhinus microlepis</i>
ดุกदान	<i>Clarias batrachus</i>
ดุก	<i>Clarias leiakanthus</i>
ดุกอู	<i>Clarias macrocephalus</i>
หลังเขียว	<i>Clupanodon thrissa</i>
หางไก่	<i>Coilia dussumieri</i>
หางไก่	<i>Coilia lindmani</i>
หางไก่	<i>Coilia macrognathus</i>
จิ้งจกถ้ำ	<i>Cryptothora thamicola</i>
กะทิง, กระต่าย	<i>Cyclocheilichthys heteronema</i>
กระเบนหางสั้น	<i>Dasyatis brevicaudatus</i>
กระเบนตาเล็ก	<i>Dasyatis microps</i>
ชีวไปไผ่แม่แดง	<i>Devario maetaensis</i>

Table 4 Fishes (Vulnerable-VU) (continue)

แดงน้อย	<i>Discherodontus ashmeadi</i>
แดงน้อย	<i>Discherodontus halei</i>
หมอตะเล	<i>Epinephelus lanceolatus</i>
กระริงลายจุด	<i>Epinephelus tukula</i>
มังกรบิน	<i>Eurypegasmus draconis</i>
อีตุ๊ด	<i>Gyrinocheilus pennocki</i>
ฉลามสันทอง	<i>Hemipristis elongatus</i>
เข็มพรุ	<i>Hemirhamphodon</i>
	<i>pogonognathus</i>
จี๊ด	<i>Heteropneustes</i>
	<i>khemarattensis</i>
กระเบนบัว	<i>Himantura bleekeri</i>
กระเบนน้ำจืดลาย	<i>Himantura krempfi</i>
กระเบนน้ำจืดขาว	<i>Himantura signifer</i>
กระเบนลายแมลงวัน	<i>Himantura uarnak</i>
ม้าหน้าหางลาย	<i>Hippocampus comes</i>
ม้าหน้าหนามยาว	<i>Hippocampus histrix</i>
ม้าหน้ายักษ์	<i>Hippocampus kelloggi</i>
ม้าหน้า	<i>Hippocampus kuda</i>
ม้าหน้าแคระ	<i>Hippocampus mohnikei</i>
ม้าหน้าหนามสั้น	<i>Hippocampus spinosissimus</i>
ม้าหน้าสามจุด	<i>Hippocampus trimaculata</i>
กระเบนธง	<i>Hypolophus sephen</i>
จิมฟันจระเข้แคระพรุ	<i>Indostomus crocodylus</i>
จิมฟันจระเข้แคระ	<i>Indostomus spinosus</i>
กุดหัวลิง	<i>Ketengus typus</i>
กางพระร่วง, กระจก	<i>Kryptopterus bicirrhis</i>
ปีกไก่	<i>Kryptopterus hexapterus</i>
ผี	<i>Kryptopterus macrocephalus</i>
หว่า	<i>Labeo pierrei</i>
แขยงหิน	<i>Leiocassis poecilopterus</i>
บา	<i>Leptobarbus hoeveni</i>
หัวตะกั่วยักษ์, ซอนเข็ม	<i>Luciocephalus pulcher</i>
แมว	<i>Lycotrissa crocodilus</i>
บวมหิดล	<i>Mahidolia mystacena</i>
บวมหิดล	<i>Mahidolia normani</i>
กระเบนราหู	<i>Manta birostris</i>
กระทิงไฟ	<i>Mastacembelus erythrotaenia</i>
สะอี	<i>Mekongina erythrospila</i>
ชีวดาเขียว	<i>Microrasbora kubotai</i>
กระเบนราหู	<i>Mobula japonica</i>
กระเบนราหู	<i>Mobula orogoodootengi</i>
กระเบนราหู	<i>Mobula thurstoni</i>
บูร์ราไฟ	<i>Mugilogobius rambaiae</i>
กระเบนไฟฟ้าสีน้ำตาล	<i>Narcine brunnea</i>
กระเบนไฟฟ้าอินเดีย	<i>Narcine indica</i>
กระเบนไฟฟ้าจุดเข็ม	<i>Narcine maculata</i>

Table 4 Fishes (Vulnerable-VU) (continue)

กระเบนไฟฟ้าจุดเล็ก	<i>Narcine prodorsalis</i>
กระเบนไฟฟ้า	<i>Narke dipterygia</i>
ฉลามทราย	<i>Negaprion acutidens</i>
บูน้อย	<i>Neodontobutis aurarmus</i>
พลวงถ้ำ	<i>Neolissochilus subterraneus</i>
บูใส	<i>Neostethus bicornis</i>
บูใส	<i>Neostethus lankesteri</i>
บูใส	<i>Neostethus siamensis</i>
ดุกบอนหางแหลม	<i>Olyra sp.1</i>
เนื้ออ่อน	<i>Ompok urbaini</i>
ใบไผ่	<i>Opisthopterus tardoore</i>
ใบไผ่	<i>Opisthopterus valenciennesi</i>
สังกะแวง	<i>Pangasius elongatus</i>
ขยุยพรุ	<i>Parakysis verrucosa</i>
กริมแรด	<i>Parosphronemus paludicola</i>
มังกรบิน	<i>Pegasus laternarius</i>
มังกรบิน	<i>Pegasus volitans</i>
อีปุด	<i>Pellona filigera</i>
บูใส	<i>Phenacostethus posthon</i>
บูสมิธ, บูใส	<i>Phenacostethus smithi</i>
หนวดพราหมณ์	<i>Polynemus aequilonaris</i>
หนวด 7 เส้น	
หนวดพราหมณ์	<i>Polynemus multifilis</i>
หนวด 14 เส้น	
จาดถ้ำ	<i>Poropuntius speleops</i>
ยี่สก, ยี่สกทอง, เอ็น	<i>Probarbus jullieni</i>
ดุกลำพัน	<i>Prophagorus nieuhofi</i>
หิวเกศพรุ	<i>Pseudoeutropius sp.</i>
แขยงขีด	<i>Pseudomystus stenomus</i>
ยอนหุยก	<i>Pteropangasius micronema</i>
ปล่องอ้อยพรุ	<i>Pungio cuneovirgata</i>
ปล่องอ้อย	<i>Pungio kuhli</i>
ปล่องอ้อย	<i>Pungio myersi</i>
ใบไผ่	<i>Raconda russelliana</i>
ชีว	<i>Rasbora agilis</i>
ชีว	<i>Rasbora bankanensis</i>
ชีว	<i>Rasbora pauciperforata</i>
ฉลามวาฬ, ทงกานต์	<i>Rhincodon typus</i>
โรนัน	<i>Rhinobatos halavi</i>
ไหลริบบิ้น	<i>Rhinomuraena quaesita</i>
ฉลามหัวแหลม	<i>Rhizoprionodon acutus</i>
ฉลามหัวแหลม	<i>Rhizoprionodon oligolinx</i>
โรนันจุดขาว	<i>Rhynchobatus australiae</i>
ค้อหางสั้น	<i>Schistura alticrista</i>
ค้อเกาะช้าง	<i>Schistura kochangensis</i>
ค้อตาบอด, ค้อถ้ำ	<i>Schistura oedipus</i>
ปล่องทองปรีดี	<i>Schistura pridii</i>



**Table 4 Fishes (Vulnerable-VU) (continue)**

ฉลามหนูเทา	<i>Scoliodon laticaudus</i>
ชะโอนหิน	<i>Silurichthys indagiriensis</i>
ชะโอนหิน	<i>Silurichthys schneideri</i>
ฉลามเสือดาว	<i>Stegostoma fasciatum</i>
กระเบนไฟฟ้า, ปลาเสียว	<i>Temera hardwickii</i>
เวียน	<i>Tor spp.</i>
ฉลามซีเซา, ฉลามครีบน้ำ	<i>Triaenodon obesus</i>
กระดี่มุก	<i>Trichogaster leeri</i>
ชีวาขางขวานเล็ก	<i>Trigonostigma espei</i>
ชีวาขางขวาน	<i>Trigonostigma heteromorpha</i>
กระเบนขนุน	<i>Urogymnus asperrimus</i>
คอยาว, คองู	<i>Vaillantella maassi</i>
เคาดำ	<i>Wallago leeri (W. micropogon)</i>
หมูหางแดง	<i>Yasuhikotakia eos</i>
หมูครีบล้างยาว	<i>Yasuhikotakia longidorsalis</i>
หมูหางลาย	<i>Yasuhikotakia splendida</i>
เข็ม	<i>Zenarchopterus clarus</i>
เข็ม	<i>Zenarchopterus pappenheimi</i>
เข็ม	<i>Zenarchopterus spp.</i>

**Table 5 Fishes (Near Threatened-NT)**

ชอนงูเห่า	<i>Channa marulius</i>
พังกบ	<i>Channa melasoma</i>
ฉลามกบเทา	<i>Chiloscyliulum griseum</i>
ฉลามกบ	<i>Chiloscyliulum indicum</i>
ฉลามกบลาย	<i>Chiloscyliulum punctatum</i>
กะรังจุดแดง	<i>Epinephelus coioides</i>
กะรังหน้าหนู	<i>Epinephelus corallicola</i>
กะรังลายหินอ่อน	<i>Epinephelus fuscoguttatus</i>
กะรังจุดดำ	<i>Epinephelus malabaricus</i>
จาละเม็ดขาว	<i>Pampus argenteus</i>
จาละเม็ดเทา	<i>Pampus chinensis</i>
สวาย	<i>Pangasianodon hypophthalmus</i>
เทโพ	<i>Pangasius larnaudi</i>
กะรังแดงจุดฟ้า	<i>Plectopoma areolatus</i>
กะรังเหลืองดำ	<i>Plectopoma laevis</i>
กะรังเหลืองจุดฟ้า	<i>Plectopoma leopardus</i>
กะรังแดงจุดฟ้า	<i>Plectopoma maculata</i>
กะรังแดงลายขีด	<i>Plectopoma pessuliferus</i>
กะรังหางวงเดือนขอบขาว	<i>Variola albimarginata</i>
กะรังหางวงเดือน	<i>Variola louti</i>

**Table 6 Fishes (Threatened in situ-TI)**

กัตป้า	<i>Betta imbellis</i>
กัตป้า	<i>Betta smaragdina</i>
กัตไทย	<i>Betta splendens</i>
กระโห้	<i>Catlocarpio siamensis</i>
ทรงเครื่อง, ฉลามหางแดง	<i>Epalzeorhynchus bicolor</i>
หม้อจวบ, หม้อตาล	<i>Helostoma temmincki</i>
บา	<i>Leptobarbus hoeveni</i>
บีก	<i>Pangasianodon gigas</i>
สวาย	<i>Pangasianodon hypophthalmus</i>
ยี่สก, ยี่สกทอง, เอ็น	<i>Probarbus jullieni</i>
ตะพัด	<i>Scleropages formosus</i>

**Table 7 Fishes (Data Deficient-DD)**

ซีตังเบ็ดฟ้าออกขาว	<i>Acanthurus leucosternon</i>
ชยุย	<i>Acrochordonichthys rugosus</i>
กระเบนนกจุดขาว	<i>Aetomylaeus maculatus</i>
กระเบนนก	<i>Aetomylaeus milvus</i>
กระเบนนกรางกะแสด	<i>Aetomylaeus vesperilio</i>
ชีวจ้ำฟ้า	<i>Amblypharyngodon chulabhornae</i>
กบลาย	<i>Antennarius maculata</i>
ผีเสื้อวงฟ้า	<i>Chaetodon bennetti</i>
ผีเสื้อหน้าสีฟ้า	<i>Chaetodon semeion</i>
โจก	<i>Cyclocheilichthys lagleri</i>
สิงโตปีกดวง	<i>Dendrochirus biocellatus</i>
ดุกแคะ	<i>Encheloclarias kelioides</i>
ปากคมน้ำจืด, หัวยุง	<i>Harpodon nahereus</i>
แยงแยงแคะ	<i>Hyalobagrus ornatus</i>
แปบยาว	<i>Longiculus siahi</i>
ไหลบึง	<i>Macrotrema caligans</i>
สินสมุทรอานทอง	<i>Pomacanthus novarchus</i>
แยงแยงพรุ	<i>Pseudomystus leiocanthus</i>
สิงโตหนวด	<i>Pterois antennata</i>
สิงโตปีกเข็ม	<i>Pterois radiata</i>
สิงโต	<i>Pterois volitans</i>
กระเบนจุมกัว	<i>Rhinoptera adspersa</i>
กระเบนจุมกัว, ยี่สน	<i>Rhinoptera javanica</i>
เห็ดโคนปากหมา	<i>Sillaginopsis punijas</i>
แรดแคะ	<i>Sphaerichthys osphronemoides</i>
จัมพินจระเข้เขี้ยว	<i>Synagthoides biaculeatus</i>
หิน	<i>Synancea horrida</i>
หิน	<i>Synancea verrucosa</i>
จัมพินจระเข้	<i>Syngnathus spicifer</i>
กระเบนลายหินอ่อน	<i>Taeniura meyeni</i>



Table 8 Fishes (Endemic)

รากล้วย	<i>Acanthopsis thiemmethdi</i>
ขยุยักษ์พรหมพิราม	<i>Acrochordonichthys gyrinus</i>
ขยุยักษ์แม่กลอง	<i>Acrochordonichthys septemtrionalis</i>
ดักแมกกรอง	<i>Amblyceps variegatum</i>
หม้อแคะแม่กลอง	<i>Badis khwae</i>
หว่าหนานอแม่กลอง	<i>Bangana</i> sp.
แขยงเขา	<i>Batasio</i> sp.1
แขยงเขา	<i>Batasio tigrinus</i>
กั๊กน้ำแดง	<i>Betta pi</i>
กั๊กกระปี่	<i>Betta simplex</i>
กั๊กมหาชัย	<i>Betta</i> sp.
กั๊กสามร้อยยอด	<i>Betta</i> sp.3
กั๊กไทย	<i>Betta splendens</i>
ชีวะแคะสามจุด	<i>Boraras micros</i>
ชีวะหนูแดง	<i>Boraras</i> sp.1
ผีเสื้อถ้ำ	<i>Cryptotora thamicola</i>
ไล่ต้น	<i>Cyclocheilichthys lagleri</i>
ชีวะใบไผ่แม่แดง	<i>Devario maetaengensis</i>
ชีวะใบไผ่เชียงดาว	<i>Devario</i> sp.1
ชีวะใบไผ่หนาน	<i>Devario</i> sp.2
ค้อหน้าหัก	<i>Ellopostoma mystax</i>
ทรงเครื่อง, ฉลามหางแดง	<i>Epalzeorhynchos bicolor</i>
มูด (สะป็น)	<i>Garra</i> sp.2
มูด (คลองงู)	<i>Garra</i> sp.3
ผีเสื้อติดหิน	<i>Hemimyzon nanensis</i>
กระเบนแม่กลอง	<i>Himantura kittipongi</i>
ติดหิน	<i>Homaloptera smithi</i>
จาด	<i>Hypsibarbus suvattii</i>
ปีกไก่หนวดยาว	<i>Kryptopterus heperius</i>
หลดแม่กลอง	<i>Macrognathus meklongensis</i>
ชีวะตาเขียว	<i>Microrasbora kubotai</i>
ชีวะแม่กลอง	<i>Microrasbora</i> sp.1
ค้อตาบอด, ค้อถ้ำ	<i>Nemacheilus trogocataractus</i>
พลวงถ้ำ	<i>Neolissochilus subterraneus</i>
บู่ใส	<i>Neostethus siamensis</i>
ดุกบอนหางแหลม	<i>Olyra</i> sp.1
ติดหิน, ค่างคว	<i>Oreoglanis siamensis</i>
ค่างควเชียงใหม่	<i>Oreoglanis</i> sp.1
ค่างควภูคา	<i>Oreoglanis</i> sp.2
ค่างควทุ่งช้าง	<i>Oreoglanis</i> sp.3
ค่างคว	<i>Oreoglanis</i> sp.4
ค่างคว	<i>Oreoglanis</i> sp.5
ค่างควหางสั้น	<i>Oreoglanis</i> sp.6
ค่างควบึงน้อย	<i>Oreoglanis</i> sp.7
ค่างควดอยตุง	<i>Oreoglanis</i> sp.8
บู่สมิธ, บู่ใส	<i>Phenacostethus smithi</i>

Table 8 Fishes (Endemic) (continue)

สายยู, หวีเกศ, เกด	<i>Platytrapius siamensis</i>
จาดถ้ำ	<i>Poropuntius speleops</i>
หวีเกศพรุ	<i>Pseudoeutropius</i> sp.
ชะโองถ้ำ	<i>Pterocryptis buccata</i>
ชีวะม่วงหางแดง	<i>Rasbora</i> sp.2
ชีวะหางใหม่แม่กลอง	<i>Rasbora</i> sp.3
บู่หน้าตกเชียงใหม่	<i>Rhinogobius chiangmaiensis</i>
บู่หน้าตกหนาน	<i>Rhinogobius</i> sp.1
บู่หน้าตกแม่กลอง	<i>Rhinogobius</i> sp.2
ค้อหัวสั้น	<i>Schistura breviceps</i>
ค้อถ้ำ	<i>Schistura deansmarti</i>
ค้อ	<i>Schistura desmotes</i>
ค้อ	<i>Schistura dubia</i>
ค้อถ้ำจากรูธานีรินทร์	<i>Schistura jaruthanini</i>
ค้อแม่น้ำหนาน	<i>Schistura menanensis</i>
ค้อตาบอด, ค้อถ้ำ	<i>Schistura oedipus</i>
ปล่องทองปรีดี	<i>Schistura pridii</i>
ค้อ	<i>Schistura schultzi</i>
ค้อถ้ำ	<i>Schistura spiesi</i>
ค้อ	<i>Schistura spilota</i>
ค้อ	<i>Schistura waltoni</i>
ค้อหัวดำ	<i>Sectoria atriceps</i>
หว่า	<i>Sinilabeo sinkleri</i>
ชีวะกะตัก	<i>Thryssocypris</i> sp.1
ชีวะสมพงษ์	<i>Trigonostigma somphongsi</i>
หมูอารีย์	<i>Yasuhikotakia sidthimunki</i>