

11. Nakai Nam Theun National Protected Area

GENERAL INFORMATION

Name Nakai Nam Theun

Area

353,200 ha (in PM Decree 164)

73,860 ha (northern corridor)

3,310 ha (southern corridor)

10,728 ha (special conservation areas)

439,498 ha (Total area)

Date of designation

29th October 1993 under PM Decree 164.

Location

Latitude: 17° 36' - 18° 23' N; Longitude: 101° 04' - 101° 32' E

Provinces

Bolikhambxay

Khammouane

Districts

Khamkeut	38,752 ha covering 11 %	[Bolikhambxay]
Boualapha	3,272 ha covering 1 %	[Khammouane]
Gnommalath	13,879 ha covering 4 %	[Khammouane]
Nakai	292,382 ha covering 84 %	[Khammouane]

Nakai Nam Theun - Phou Hin Poun Corridor	Khamkeut and Nakai	44,582 ha
Nakai Nam Theun - Hin Nam No Corridor	Boualapha	3,310 ha

Boundaries

The northernmost point of the Nakai Nam Theun National Protected Area is at the Nam Phao international border checkpoint in Khamkeut District. From there, the protected area boundary follows the international border southeastwards for 161 km to the Cholor international border checkpoint at Mu Gia pass situated in Boualapha District. From Cholor checkpoint, the boundary runs along the base of the Phou Ak escarpment parallel to the north side of Route 12 through both Boualapha and Gnommalath Districts. Just past the village of Ban Don, the boundary turns northeast to the east side of the Nam Theun reservoir. It then runs along the Nakai Plateau on the northeastern side of the Nam Theun reservoir. The western boundary follows the base of the "dividing hills" where it continues northeast and follows the former Nam Theun to the Nam Sot. From there, the boundary meets up with Route 8B as it passes through the gorge onto the Nakai Plateau, skirting around populated valleys (Nam Weo and Nam Kata). It then follows the southern side of Route 8A northeast along the base of the Annamite foothills to the international border with Vietnam.

The establishment of the Nam Theun Corridor links the Khammouane Limestone National Protected Area with this large trans-border area and is the habitat of certain species not recorded elsewhere in the Nakai-Nam Theun National Protected Area, as well as being regularly used by elephants from the Nakai Plateau (WCS 1996a). The small Southern Corridor provides a crucial

link to the large Him Nam No National Protected Area which is itself adjoins the Phong Nha-Ke Bang Nature Reserve in Vietnam.

Access

There is only one main road which enters the heart of the protected area, this is the road entering the National Protected Area from Route 8B (around Ban Kengdaeng, Khamkeut District) to Ban Thamuang (on the Nam Sot) to Ban Navang (on the Nam Mon). However, this road is in disrepair and has been out of use since 1998. This road actually continues as a track suitable for dry season logging access up to Phou Xong and the east along a ridge for a distance over 10 km; however it was never used for logging. The Nakai Plateau can also be accessed from Thakek via Route 12 and then Route 8 B to Nakai District Town and the Nakai Plateau. The section of this road from Gnommalath to Nakai (up the Phou Ak escarpment), as well as the portion of Route 8B on the Nakai Plateau becomes most difficult in the wet season. A network of dry season logging roads enter the National Protected Area along the perimeter of the Nam Theun 2 reservoir inundation area (538 m asl contour) on the eastern side of the Nakai Plateau. The entire western side of the National Protected Area is almost adjacent to Route 8 A & B and Route 12.

Map Sheets

Scale 1: 50,000

6045-4	6045-1		
6045-3	6045-2	6145-3	
6044-4	6044-1	6144-4	
6044-3	6044-2	6144-3	6144-2

Scale 1: 100,000 (dotted lines represent proposed extension areas)

E-48-42	E-48-43		
E-48-54	E-48-55		
E-48-66	E-48-67	E-48-68	
E-48-78	E-48-79	E-48-80	
E-48-90	E-48-91	E-48-92	E-48-93

BRIEF HISTORY

Early 1700s	Sek people arrive in the Nam Pheo valley (off Nam Noy) displacing an older Vietic (Kri-Phong) population there.
1828-1860	Siamese occupation of the Nakai Plateau and adjacent areas. The Sek of the Nam Pheo retreated into Vietnam and the Sek of Na Kadok (Khamkeut District) sought refuge in Ban Navang (Nakai District), where their terraced paddies still exist (now cultivated by Brou).
1860-1900	This period is characterized by the departure of the Siamese and the populating of the Nam Noy basin by Phong-Kri speakers. The Brou subsequently arrived into what is now the protected area, probably from Gnommalath to escape the Siamese depopulation policy which was implemented vigorously in the lowlands. Also in this period, beginning in about 1880, many Tai speakers from Houaphan and Nghe An fled into Khamkeut to escape the Cheuang Millinarian war carried out by the Khmou in those areas.
1900-1960	French colonial presence in Lak 20 and the trade with Vietnam on Route 8. Some associated logging in certain valleys of what is now proposed as the Northern Extension is believed to have taken place during this time.
1960-1975	Fighting between the Pathet Lao/North Vietnam Army and the Royal Lao Government/US Government erupts in the area. Over 1,000 NVA troops in the

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	protected area and significant branches of the Ho Chi Minh trail follow the periphery of the current NBCA - mostly along Route 8 and Route 12 across the Nakai Plateau. While these areas receive significant bombing by the US Government, most of the NBCA is spared heavy bombing.
1976-1990	With the consolidation of the Revolution, re-education camps were established on the Nakai Plateau and some Vietic speakers were moved from the forest to newly established villages (e.g. Ban Thamuang) in an effort to sedentarize them. USSR sponsored timber and soil surveys were carried out throughout the area. Military control of the area, through the "Mountainous Area Development Company" (Bolisat Phattana Khet Phoudoi - BPKP) begins exploiting forest resources on the Nakai Plateau and parts of the NBCA in Khamkeut District.
1991-1996	The Nam Theun 2 Hydropower project is formally proposed to the GoL and preparations began. Salvage logging of the Nakai Plateau (e.g. the proposed inundation area) increased in scale to 150,000 m ³ per year and some logging of <i>Fokienia</i> in the NBCA took place. The NBCA was gazetted in 1993. Systematic wildlife surveys in the area began in 1995. In 1996, IUCN and WCS announced their support for NT2 assuming World Bank and GoL agreement with environmental management conditions. NT2 was delayed with the lapse of the power purchase MOU with EGAT and onset of the Asian economic crisis.
1997-1999	World Bank and GoL funded IUCN and WCS to conduct environmental and social management planning for the area within the context of the proposed NT2 project which resulted in an "environmental and social management strategic framework". Pilot field activities in community development and biodiversity conservation were initiated in the NBCA. NT2 project appraisal was further delayed and the start-date for construction of the NT2 dam was estimated at December 2001 with commissioning at the end of 2006.
2001	Decree No. 25
2005	First annual work plan for the Watershed Management and Protection Authority approved with an operational budget of US \$ 1 million.
2008	First inundation of the reservoir during the wet season
2010	Prime Minister Decree No.471/PM dated 11 th November 2010 on the management of Nakai Nam Theun National Protected Area and the Nam Theun 2 watershed area.
2017	Decree No. 122/PM dated 21 st April 2017 on the Nam Theun 2 Watershed Management and Protection Authority defines the legal status, duties, organizational structure and implementing mechanism of the Nakai Nam Theun Watershed Management and Protection Authority.

CURRENT MANAGEMENT

National Protected Area Staffing

Under Decree 122/PM, dated 21st April 2018 the protected area has a Secretariat, which is the administrative office of the Nam Theun 2 Watershed Management and Protection Authority. This body comprises a Director, a Deputy Director and technical staff. As of January 2018, there were 12 protected area technical staff; there are no volunteers. These staff are organized into five technical units, comprising (i) an administration unit, (ii) a biodiversity and monitoring unit, (iii) a law enforcement unit, (iv) an outreach unit, and (v) an ecotourism unit.

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Nakai-Nam Theun National Protected Area (NPA) and its Peripheral Impact Zone (PIZ) are officially designated as an off-set watershed area for Nam Theun 2 Hydropower Project (NT2) since 2005. The watershed is under the management of the Nam Theun 2 Watershed Management and Protection Authority (WMPA) since 2005. The operation and implementation plans of the WMPA were defined in 2005 in the first Social and Environmental Management Framework and Operational Plan (SEMFOP1) to ensure the effective, long-term protection of the biodiversity and watershed values of the NT2 catchment and the safeguard of the well-being, traditional livelihoods and culture of its human inhabitants.

The WMPA is under external auditing parties including the Panel of Experts (POE), reporting directly to the Government of Laos.

In 2013, evaluations of the performance of the WMPA by the POE led to the decision from the Government of Lao PDR for an overall restructure of the WMPA. The Government of Lao PDR set up a Task Force in 2014 to reform, reorganize and restructure the WMPA.

The WMPA is completing its restructuring in 2018. The restructured WMPA will largely be a new institution with a new team. The WMPA signed a 5-year service contract with a consortium of four conservation NGOs, namely the Wildlife Conservation Association (WCA), Agrisud International Project Anoulak and Creative Literacy Laos (CLL). The Consortium is integrated to the WMPA organization and contributes to both the capacity building of WMPA and the delivery of the 5-year Plan for 2017-2021.

Buildings

The protected area Headquarters and staff accommodation are located in Nakai District Town, being constructed in 2010. Ranger stations are present in Navang cluster, Thaipaiban cluster and Teung cluster, which fulfil multi-purpose management roles.

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Collaborative system and stakeholders

The collaborative management system within Nakai Nam Theun National Protected Area has been strongly influenced by the management system espoused in the Social Environmental Management Framework and 1st Operational Plan (SEMFOP 1). This approach is termed "Participatory Integrated Conservation and Development" or PICAD. Through this approach, the technical units within the National Protected Area work with their district counterparts, and then provide technical support to the enclave villagers and the villagers in the buffer zone.

Nakai Nam Theun National Protected Area – Board of Directors

The protected area has had a supervisory Board of Directors, for 13 years, with generally the same overall membership. The chairman has changed from the Minister of the Ministry of Agriculture and Forestry, to the Khammouane Deputy Governor, and back to the Minister of MAF again. Other Board members comprise provincial and district officials from the agriculture, and army sectors. The ordinary Board meetings are convened biannually. The working arrangements of the Board of Directors is prescribed in Sections 3 and 4 of the Decree 122/PM.

Protected area working groups

Under the DCMC, five working groups were established in different fields of protected area management, with varying degrees of capacity and expertise.

Village Cluster Development Committees

Village Cluster Development committees have been established in the five village clusters consisting of 19 members.

Village Development Committee

Financial Support

Ongoing financial support has been provided to the management body for Nakai Nam Theun National Protected Area as part of a concession agreement.

Current Management Priorities

Management priorities are outlined in the five year SEMFOP 3 management Plan (2016-2020).

BIO-PHYSICAL ENVIRONMENT

Physical Features

The Sai Phou Louang (Annamite) Mountains within the National Protected Area (divided within the protected area into the Northern, Central and Southern Mountains areas) running NW-SE dissected by NE-SW oriented river valleys form the bulk of the protected area. As these rivers emerge through gorges in the Dividing Hills onto the Nakai Plateau, the five main rivers (Nam Sot, Nam Mon, Nam Theun, Nam Noy and Nam One) widen and meander, creating rich riverine forest habitat. The Dividing Hills are a NW-SE oriented range up to 1,000 m separating the Nakai Plateau from the Northern and Central Mountains area. The Nam Theun leaves the plateau at its north-western end, turns to the west and eventually joins the Mekong River as the Nam Kading. Elevations in the protected area range from 500-2,200 m; with 500-580 m asl on the Nakai Plateau, 600-1,100 m asl in the Dividing Hills; and 600 - 2,200 m asl in the Central and Southern Mountains.

Elevation

500 - 2200 m asl

Climate

Nakai-Nam Theun National Protected Area is in the Southeast Asia monsoon climate regime. During the winter (November-February), when the sun is to the south of the equator the climate is under the influence of the cold continental high pressure region over China. The winds are clockwise around the high and are from the northeast over Southeast Asia. This is the Northeast Monsoon, characterised by cold dry air and infrequent and light rain. For summer (May-August), the sun is to the north of the equator and heats the land mass beneath to a degree that causes an extensive low pressure region called the Inter-tropical Convergence Zone and the Monsoon Trough. Warm winds from the southwest carry moisture from the Andaman Sea and the Gulf of Thailand to the part of the trough in the Lao PDR region where vertical convection causes the rainfall, large amounts during the height of the monsoon season. This is the Southwest Monsoon. The air is warm, and humidity high.

For the National Protected Area, the Southwest Monsoon begins in May, reaches its maximum strength in August and disappears about mid-October. The climate then cycles through a transition period to mid-November when the Northeast Monsoon appears. Rainfall becomes very infrequent and light, the air is cool, and the humidity lower. The Northeast Monsoon lasts until the end of February when the hot and dry transition period begins. In addition to the monsoons, the National Protected Area is occasionally visited by typhoons and tropical depressions, generally in September and October. The nine year history (1986-1994) of average monthly rainfall at Ban Signo on the Nakai Plateau follows the general pattern of the Southeast Asia monsoon. The yearly average is 2,249 mm. This value can be taken as representative of the entire Plateau region. Rainfall in the upper catchment area of the Nakai Nam Theun National Protected Area is expected to be greater but there is no reliable data available. The DMH National Isohyetal Map indicates that this region receives annually from 2,500 to 3,000 mm of rainfall.

Main Forest Types

There is a complex range of habitats in Nakai Nam Theun National Protected Area which reflect pronounced gradients in soils, altitudes and microclimates. Habitat types usually blend into one

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another, and there is rarely a sharp divide between them. Component species of habitat floras are poorly known and will remain so until a systematic collecting programme is in place. Evergreen forest has plant families and genera typical for other parts of Southeast Asia. Commonly found were species of *Dipterocarpus* and *Shorea* in the Dipterocarpaceae, and species of Myristicaceae, Annonaceae, Rutaceae, Sapindaceae, Fabaceae etc. The upper canopy reaches generally around 20 m, with emergent trees reaching to about 30 m. The diameter of larger trees is in the 50-60 cm class, with occasional emergent trees having diameters exceeding 120-cm. Palms, including rattan, are uncommon in the northern portion of the protected area, but frequent in the central and southern areas.

Montane Fagaceous forest occurs at higher elevations toward the Vietnam border in the southern part of the National Protected Area, which have scattered and small populations of cypress. Fagaceous forest shows a mosaic of species associations and distribution patterns. Within the Fagaceae and other families, some species are generalists, found everywhere, and others are highly localized. Cloud forest occurs on mountains south of Ban Nameo. The transition between montane Fagaceous and cloud Ericaceous forest was sharp, occurring at about 1600 m. Ericaceous species dominated this habitat, in particular *Rhododendron cf. veitchianum* Hooker. Riverine forest is the only habitat where a tree species of *Poikilospermum* (Urticaceae) was seen. The habitat protects a large variety of herbs. In the Nam Sot area where riverbanks are shallow and many areas appear to flood regularly, component species of habitat floras will remain unknown until a thorough collecting program is in place.

One of the unique features of Nakai Nam Theun National Protected Area is the occurrence of highly restricted 'everwet forest'. This occurs only in narrow bands where there are low elevation saddles in the Sai Phou Louang (Annamite) chain. These saddles allow the Vietnamese northeast monsoon to penetrate across the border and consequently these areas receive rain for up to ten months of the year. These areas are typically very wet in January-February when adjacent areas of habitat are in the midst of harsh dry season. It is probable that the fauna and flora assemblages are unique as the habitat occurs nowhere else in Lao PDR.

Key Wildlife Species

Three intensive biodiversity surveys undertaken in the mid-1990's form the foundation of knowledge on the vertebrate taxonomic groups found within the protected area. These surveys comprise "A preliminary wildlife and habitat survey of the proposed northern extension to the Nakai-Nam Theun National Biodiversity Conservation Area and adjacent Nam Gnouang area, Lao PDR." conducted by Tizard (1996); "A wildlife and habitat survey of Nakai-Nam Theun National Biodiversity Conservation Area, Khammouane and Bolikhamxay Provinces, Lao PDR." by Timmins, R. J. and Evans, T. D. (1996); and a "Report on 1996 survey of bats and small mammals in the Nakai-Nam Theun NBCA and nearby areas" by Francis *et al.* (1996). However, it should be acknowledged that some of the large mammalian species like tiger and saola have undergone severe population declines, or even extinction, within the reserve during the intermittent period.

An intensive and largely ongoing biodiversity monitoring programme was introduced in 2005, which continues to the present day.

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Confirmed mammal species of conservation interest in Nakai Nam Theun National Protected Area

Common Name	Scientific Name	National Priority	Global Threat Category	Lao Risk Status
Chinese Pangolin	<i>Manis pentadactyla</i>	HNP	GNT	ARL
Sunda Pangolin	<i>Manis javanica</i>	HNP	GNT	ARL
Sunda Colugo	<i>Cynocephalus variegatus</i>	0	LKL	
Large loris species	<i>Species not identified</i>	-	-	-
Small loris species	<i>Species not identified</i>	-	-	-

Pig-tailed Macaque	<i>Macaca nemestrina</i>	-	VU	PARL
Assamese Macaque	<i>Macaca assamensis</i>	-	VU	PARL
Rhesus Macaque	<i>Macaca mulatta</i>	-	GNT	PARL
Bear Macaque	<i>Macaca arctoides</i>	-	VU	PARL
Francois's Langur	<i>Semnopithecus francoisi</i>	-	DD	PARL
Douc Langur	<i>Pygathrix nemaeus</i>	HNP	EN	ARL
Northern White-cheeked Crested Gibbon	<i>Nomascus siki</i>	HNP	DD	PARL
Southern White-cheeked Crested Gibbon	<i>Nomascus leucogenys</i>	INP	DD	LKL
Black Giant Squirrel	<i>Ratufa bicolor</i>	-	0	PARL
Inornate Squirrel	<i>Callosciurus inornatus</i>	-	VU	LKL
Small flying squirrel species	<i>Species not identified</i>	-	-	-
East Asian Porcupine	<i>Hystrix brachyuran</i>	-	VU	0
Dhole	<i>Cuon alpinus</i>	HNP	VU	ARL
Asiatic Black Bear	<i>Ursus thibetanus</i>	ANP	VU	ARL
Sun Bear	<i>Ursus malayanus</i>	HNP	DD	ARL
Bear species	<i>Species not identified</i>	-	-	-
Siberian Weasel	<i>Mustela sibirica</i>	-	0	LKL
Back-striped Weasel	<i>Mustela strigidorsa</i>	-	VU	LKL
Weasel species	<i>Species not identified</i>	-	-	-
Hog Badger	<i>Arctonyx collaris</i>	-	0	LKL
Oriental Small-clawed Otter	<i>Aonyx cinera</i>	HNP	GNT	ARL
Otter species	<i>Species not identified</i>	-	-	-
Spotted Linsang	<i>Prionodon pardicolor</i>	-	0	LKL
Asian Golden Cat	<i>Catopuma temminckii</i>	INP	GNT	LKL
Marbled Cat	<i>Pardofelis marmorata</i>	INP	DD	LKL
Clouded Leopard	<i>Pardofelis nebulosi</i>	HNP	VU	ARL
Medium-sized cat species	<i>Species not identified</i>	-	-	-
Leopard	<i>Panthera pardus</i>	HNP	0	ARL
Tiger	<i>Panthera tigris</i>	ANP	EN	ARL
Big cat species	<i>Species not identified</i>	-	-	-
Asian Elephant	<i>Elephas maximus</i>	HNP	EN	ARL
Pig species	<i>Species not identified</i>	-	-	-
Sambar	<i>Cervus rusa</i>	-	0	PARL
Large-antlered Muntjac	<i>Muntiacus vuquangensis</i>	-	N/A	PARL
Small muntjac species	<i>Species not identified</i>	-	-	-
Gaur	<i>Bos gaurus</i>	HNP	VU	ARL
Southern Serow	<i>Naemohedus sumatraensis</i>	-	VU	PARL
Saola	<i>Pseudoryx nghetinhensis</i>	ANP	EN	ARL

The protected area has 45 species of bats and eight species of rodents.

Confirmed bird species of conservation interest in Nakai Nam Theun National Protected Area

Common Name	Scientific Name	National Priority	Global Threat Category	Lao Risk Status
Siamese Fireback	<i>Lophura diardi</i>	-	VU	PARL
Crested Argus	<i>Rheinardia ocellata</i>	HNP	VU	ARL

White-winged Duck	<i>Cairina scutulata</i>	ANP	EN	ARL
Red-collared Woodpecker	<i>Picus rabieri</i>	-	VU	0
Great Hornbill	<i>Buceros bicornis</i>	HNP	0	ARL
Brown Hornbill	<i>Anorrhinus tickelli</i>	-	GNT	PARL
Rufous-necked Hornbill	<i>Aceros nipalensis</i>	HNP	VU	ARL
Wreathed Hornbill	<i>Aceros undulatus</i>	-	0	ARL
Blyth's Kingfisher	<i>Alcedo Hercules</i>	-	VU	PARL
Coral-billed Ground Cuckoo	<i>Carpococcyx renauldi</i>	-	GNT	0
Tawny Fish Owl	<i>Ketupa flavipes</i>	-	GNT	LKL
Fish owl species	<i>Species not identified</i>	-	-	-
Yellow-vented Green Pigeon	<i>Treron seimundi</i>	-	GNT	0
White-bellied Green Pigeon	<i>Treron sieboldin</i>	-	GNT	LKL
Green Imperial Pigeon	<i>Ducula aenea</i>	-	0	ARL
Wood Snipe	<i>Gallinago nemoricola</i>	-	VU	LKL
River Lapwing	<i>Vanellus duvaucelii</i>	INP	0	ARL
Grey-headed Lapwing	<i>Vanellus cinereus</i>	-	GNT	PARL
Small Pratincole	<i>Glareola lacteal</i>	-	0	PARL
Jerdon's Baza	<i>Aviceda jerdoni</i>	-	GNT	0
Black Kite	<i>Milvus migrans</i>	-	0	ARL
Lesser Fish Eagle	<i>Ichthyophaga humilis</i>	INP	GNT	ARL
Pied Falconet	<i>Microhierax melanoleucos</i>	-	GNT	LKL
Grey Heron	<i>Ardea cinerea</i>	-	0	PARL
Purple Heron	<i>Ardea purpurea</i>	-	0	PARL
Black Stork	<i>Ciconia nigra</i>	-	0	ARL
Blue-rumped Pitta	<i>Pitta soror</i>	-	GNT	PARL
White-winged Magpie	<i>Urocissa whiteheadi</i>	-	GNT	PARL
Indochinese Green Magpie	<i>Cissa hypoleuca</i>	-	GNT	PARL
Swinhoe's Minivet	<i>Pericrocotus cantonensis</i>	-	GNT	0
Japanese Paradise-flycatcher	<i>Terpsiphone paradisi</i>	-	GNT	LKL
Black-breasted Thrush	<i>Turdus dissimilis</i>	-	GNT	LKL
Grey-sided Thrush	<i>Turdus feae</i>	-	VU	LKL
Brown Dipper	<i>Cinclus pallasii</i>	-	0	PARL
Green Cochoa	<i>Cochoa viridis</i>	-	GNT	0
Golden-crested Myna	<i>Ampeliceps coronatus</i>	-	0	PARL
Beautiful Nuthatch	<i>Sitta Formosa</i>	-	VU	PARL
Yellow-vented Warbler	<i>Phylloscopus cantator</i>	-	GNT	0
Grey Laughingthrush	<i>Garrulax maesi</i>	-	GNT	0
Red-tailed Laughingthrush	<i>Garrulax milnei</i>	-	GNT	0
Short-tailed Scimitar Babbler	<i>Jabouilleia danjoui</i>	-	VU	PARL
Spectacled Fulvetta	<i>Alcippe ruficapilla</i>	-	GNT	0
Rufous-throated Fulvetta	<i>Alcippe rufogularis</i>	-	GNT	0
Lesser Rufous-headed Parrotbill	<i>Paradoxornis atrosuperciliaris</i>	-	GNT	LKL

The National Protected Area has recorded 53 species of reptiles and amphibians. Recent surveys (Robichaud and Stuart 1999) identified 51 reptile and amphibian species inside the protected area,

including two new species (a caecilian and a skink). However it is believed that this is not exhaustive, as the survey did not adequately cover warmer months nor higher elevations (above 800 m).

Classification key

National Priority Categories

ANP: Acute National Priority; **HNP:** High National Priority; **INP:** Intermediate National Priority

Global Threat Categories

0: not listed as of concern; **DD:** data deficient; **GNT:** globally near-threatened; **GT-CR:** globally threatened - critical; **GT-EN:** globally threatened - endangered; **GT-VU:** globally threatened - vulnerable; **n/a:** not applicable.

Lao Risk Status

0: not at risk in Lao PDR; **ARL:** at risk in Lao PDR; **CARL:** conditionally at risk in Lao PDR; **LKL:** little known in Lao PDR; **n/a:** not applicable; **PARL:** potentially at risk in Lao PDR.

(Duckworth *et al.*, 1999)

MAIN THREATS

The primary threats to the National Protected Area were identified through a recent village consultation process (Vongkhamheng, 2017). They include:

- Increasing illegal hunting inside the protected area by Vietnamese nationals crossing the international border into the area
- Increasing illegal hunting by Lao nationals coming from surrounding areas outside the NPA
- Unsustainable and/or illegal hunting by community members within the National Protected Area
- Presence of middlemen in village within the National Protected Area incentivizing unsustainable/illegal hunting
- Proximity to the international border with Vietnam
- Persistence/availability of hunting tool, i.e., snares, home-made guns, etc.
- Continued illegal extraction of luxury timber to supply national, but probably predominately international, timber trading networks
- Increasing encroachment within the NPA of outsiders from surrounding areas, and beyond, seeking land

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INFRASTRUCTURE AND MINING PROJECTS

- Nam Theun 2 Hydropower Project is a 1088 MW initiative, which has flooded the Nam Theun River in 2008 on the southwestern periphery of the protected area. The reservoir floods an area of ha, and the inundation area extends up the five river tributaries every 10- 15 km.. Total reservoir protected area interface exceeds 1,100 km. The reservoir resulted in the resettlement of 18 ethnically diverse villages. Access for illegal activities, including rampant illegal logging has largely been controlled, following the logging export ban (in May, 2016). The project has a concession agreement with the Lao Government to fund management of the Nkai Nam Theun National Protected Area watershed for 31 years.
- Gold mining occurs in the buffer zone villages in Khamkeut district. Efforts to extend activities into the protected area have been thwarted.

SOCIO-ECONOMIC ENVIRONMENT

Stakeholder Villages and Population

Three types of villages are identified as priority village partners with respect to their location and natural resource use patterns:

- I Villages situated inside Nakai Nam Theun National Protected Area
- II Villages situated outside Nakai Nam Theun National Protected Area with use of agricultural land and other resources inside the protected area
- III Villages situated outside Nakai Nam Theun National Protected Area with the village boundary touching the protected area boundary and with resource use other than land use inside the protected area.

The population data were collected by the State Planning Committee of the National Statistical Centre for the National Population Census 2015.

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District	No. of Villages	No. of Villages by type			Population
		I	II	III	
Khamkeut	21	0	21	0	19,877
Nakai	29	13	0	16	
Gnommalath	7	0	0	7	3,903
Boualapha	2	0	0	2	3,009
TOTAL	59	13	21	25	

Population statistics and ethnicity for the 21 guardian villages in Khamkeut district, Bolikhamxay province in Nakai Nam Theun National Protected Area.

No.	Name of Village	Village cluster	Ethnic group	No of HHs	No of persons	Location
1	TungBaie	TungBaie	Hmong; Meang; Lao Loum	307	2440	Overlap
2	NaMeuang	ThungKhe	Hmong; Meang; Mueg	104	649	Overlap
3	NaHai	ThungKhe	Meang; Mueg	90	492	Overlap
4	Nathon	ThungKhe	Meang	131	109	Overlap
5	Nakadok	ThungKhe	Meang; Mueg	132	941	Overlap
6	ThungKhe	ThungKhe	Hmong	183	1056	Overlap
7	VangPha	ThungSaeng	Hmong	108	759	Overlap
8	NamDuern	ThungSaeng	Hmong; Lao Loum	181	1185	Overlap
9	NongMek	ThungSaeng	Lao Loum	119	585	Overlap
10	PhoneSee	ThungSaeng	Lao Loum; Meang	91	464	Overlap
11	PhoneSaat	ThungSaeng	Hmong	227	1502	Overlap
12	KorHai	ThungSaeng	Hmong; Lao Loum	233	1652	Overlap
13	PhoneVilai	ThungSaeng	Hmong; Lao Loum	187	1505	Overlap
14	PhoneTong	Khamouanne	Hmong; Lao Loum; Meang; Mueg	379	2065	Overlap
15	SopPuen	Khamouanne	Hmong; Lao Loum; Meang; Mueg	156	805	Overlap
16	DoneSaat	Khamouanne	Meang; Mueg	59	326	Overlap
17	Khammouanne	Khamouanne	Lao Loum; Meang; Mueg	119	664	Overlap
18	DongBung	Khamouanne	Lao Loum; Meang; Mueg	140	814	Overlap
19	PaMeuangHung	NongGot	Hmong; Lao Loum; Meang;	164	1132	Overlap

			Mueg			
20	PhoneName	NongGot	Hmong; Lao Loum; Meang; Mueg	63	146	Overlap
21	NaNgoi	NongGot	Hmong; Lao Loum; Meang; Mueg	84	586	Overlap
Total				3,257	19,877	

(Watershed Management Protection Authority; National Statistical Centre for the National Population Census, 2015).

Population statistics and ethnicity for the two guardian villages in Boualapha district, Khammouane province in Nakai Nam Theun National Protected Area.

No.	Name of Village	Village cluster	Ethnic group	No of HHs	No of persons	Location
1	Thongkhum	Thongkhum	Makong	336	2,064	Outside
2	LangKang	LangKang	Makong; Yoy	207	945	Outside
Total				453	3,009	

(Watershed Protection Management Authority; National Statistical Centre for the National Population Census, 2015).

Population statistics and ethnicity for the seven guardian villages in Gnommalath district, Khammouane province in Nakai Nam Theun National Protected Area

No.	Name of Village	Village cluster	Ethnic group	No of HHs	No of persons	Location
1	Thongkong	Nabor	Yoy	127	503	Outside
2	Nabo	Nabor	Yoy	111	504	Outside
3	Hangkhan	Nabor	Yoy	186	739	Outside
4	Khilik	Nabor	Yoy	142	757	Outside
5	Sangpoungbone	XiangDao	Yoy	113	554	Outside
6	KhamHae	XiangDao	Yoy	98	446	Outside
7	Nathin	XiangDao	Yoy	84	400	Outside
Total				861	3,903	

(Watershed Protection Management Authority; National Statistical Centre for the National Population Census, 2015).

Population statistics and ethnicity for the 10 resettlement villages in Nakai Nam Theun National Protected Area in Nakai district, Khammouane province

No.	Name of Village	Village cluster	Ethnic group	No of HHs	No of persons	Location
1	Bouachaleun	Nakai	Tai daeng; Tai dam; Tai moei; Taimen	204	876	Outside
2	Nong Hom	Nakai	Tai dam; Tai daeng; Tai moei; Taimen	184	924	Outside
3	SopMa	Nakai	Tai Moei; Taimen	112	456	Outside
4	Nakai	Nakai	Tai moei, Tai daeng, Tai Aek; Tai E; Taimen; Taisin	395	1823	Outside
5	Oudomsuk	Nakai	Taimen, Tai Moei, Tai daeng; Tai Aek, taipao, Tai E, Taisam.	706	1442	Outside
6	HouyMalai	Nakai	Kaleung; Makong; Nyaw; Phuan; Tai Bo; Tai daeng; Tai Lao; Tai Moei	218	967	Outside

7	Bouama	Nakai	Makong; Nti; Phong; Tai Bo	112	456	Outside
8	Phousaon	Nakai	Makong; Tai Bo; Tai Dam; Tai Lao	294	1160	Outside
9	Done	Nakai	Makong; Tai Bo; Yooy	224	1086	Outside
10	KhoneKene	Nakai		78	333	Outside
Total				2527	9523	

(Watershed Protection Management Authority; National Statistical Centre for the National Population Census, 2015).

Population statistics and ethnicity for the 13 enclave villages in Nakai Nam Theun National Protected Area in Nakai district, Khammouane province.

No.	Name of Village	Village cluster	Ethnic group	No of HHs	No of persons	Location
1	Navang	Navang	Makong	116	605	Inside
2	FangDeng	Navang	Makong	108	609	Inside
3	Nahao	Navang	Makong	185	1049	Inside
4	Makfeung	Thaphayban	Makong	120	659	Inside
5	Thaphayban	Thaphayban	Makong	49	269	Inside
6	Korbong	Thaphayban	Makong	61	342	Inside
7	Vangtheunkham	Thaphayban	Makong; Slang	112	558	Inside
8	Nameuy	Teung	Makong; Seek	128	299	Inside
9	Poungsan	Teung	Makong	46	289	Inside
10	Tong	Teung	Makong	103	542	Inside
11	Thongnoi	Teung	Makong	57	359	Inside
12	Teung	Teung	Seek	62	381	Inside
13	MaKa	Teung	Makong	62	352	Inside
Total				209	6,313	

(Watershed Protection Management Authority; National Statistical Centre for the National Population Census, 2015).

Population statistics and ethnicity for the six buffer zone villages in Nakai Nam Theun National Protected Area in Nakai district, Khammouane province

No.	Name of Village	Village cluster	Ethnic group	No of HHs	No of persons	Location
1	Phadang	Natane	Moei; Taimen,	67	342	Outside
2	Nahang	Natane	Moei; Taimen,	29	150	Outside
3	Thakankeo	Natane	Moei; Taimen,	55	344	Outside
4	Nabone	Natane	Moei; Taimen,	24	149	Outside
5	Natan	Natane	Moei; Taimen,	27	165	Outside
6	Donekeo	Muang Luang	Moei; Taimen,	368	62	Outside
Total				570	1,212	

(Watershed Protection Management Authority; National Statistical Centre for the National Population Census, 2015).

Principal Local Resource Uses

The 6,500 or so residents of the protected area cultivate rotational swidden on a total of about 3% of the land area of the protected area, this includes fallows. These residents also use a wide variety of NTFPs in their daily life (rattans, foods, Kho leaves, etc.) and some collect a few NTFPs for trade (cardamom, bong bark, etc.). Most of these people also supplement their agriculture with fishing and hunting. A portion also hunts for trade. A more significant use of wildlife and other more valuable NTFPs has been by outsiders. Almost all of the Eaglewood *Aquilaria sp.* has already been depleted. A rattan concession in 1996-7 seems to have depleted most of the large diameter rattans from the protected area. International poachers have been active in the area since the mid-1980s in force and they continue to deplete the wildlife on a significant scale.

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Ethnic Composition

Within the National Protected Area, the entire population of about 6,500 are considered "Lao Theung", including a variety of Vietic (Mon-Khmer) speakers 31%, Brou (Western Katuic branch of Mon-Khmer) 55%, and Tai-Sek (Tai-Kadai) 14%. There is an increasing Hmong population on the periphery of the protected area in Khamkeut District, Bolikhamxay Province.

TOURISM VALUES

Nakai-Nam Theun is located on Khammouane Province's main tourist route, "The Loop", which receives an estimated 10,000 visitors annually and growing. Tourists typically travel by motorbike, starting and ending in Thakek and visiting the province's major attractions including Kong Lor Cave, Lak Xao, and Buddha Cave. Most visitors on The Loop stop in Thalang for one night, located on the north-western side of the reservoir just across from the protected area. Nakai's unique location offers an amazing opportunity to tap Khammouane Province's tourism market. Nakai is also within one day's drive from Vientiane, offering moderate potential for the domestic and expat market.

The protected area offers one of the best chances in Laos to see Douc langurs and may potentially be a relatively good location in Laos for seeing Asian elephants and gibbons. The area also holds potential to be the main area accessible to tourists for viewing key species of the Annamites, with Vietnam protected areas having less species abundance and similar areas in Laos having greater difficulties with access and logistics. Nakai's vast, dense forests hold good opportunity for true wilderness camping experiences. Its many rivers also hold relatively good potential for kayaking and boating, as rivers in other areas are increasingly becoming dammed and inaccessible. There are many beautiful scenic routes, including Route 8A (Lak 20 - Vietnam Border). The site also offers an interesting component of cultural tourism, based upon the ethnic diversity found within the site at the key village entry points for trekking and wildlife viewing.

Access requires entry by boat from the Nam Theun 2 Reservoir, followed by local village transport into the three village clusters. Access to some of the more remote areas that hold the greatest abundance of species can require significant amounts of time. Currently there is a lack of any accommodation or services inside the protected area, and approval for tourism has yet to be made official, which has limited tourism activities to date. The prevalence of international, armed poachers is one potential concern that has caused authorities to not open the area to tourism yet. The incidence of malaria is also high in the area, making health and safety of higher another concern.

MANAGEMENT PLANS AND ZONING

The management of Nakai Nam Theun National Protected Area was guided by the Social Environmental Management Framework and 1st Operational Plan (SEMFOP 1) for the first seven year period (April 2005 to September 2011) of the WMPA. The SEMFOP 1 was organized into seven parts. A follow-up management plan, SEMFOP 2, was implemented between 2012 and 2016. A third management plan

Zoning of the protected area is based on two issues. Village forest and land use planning has formed the basis of identifying the controlled use zones for the 11 villages within the three clusters, comprising Navang, Thaiphaban and Teung clusters. In addition, biodiversity monitoring identified three priority biodiversity zones.

PRINCIPAL CONTRIBUTIONS TO THE PROTECTED AREA SYSTEM

Fact Sheet: Nakai-Nam Theun National Protected Area

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Biodiversity Values

Nakai Nam Theun National Protected Area represents Lao PDR's largest¹ (3,710 km²) and most diverse natural forest area. Three of the last five large mammals to be discovered or re-discovered worldwide occur within the protected area. The most distinct of these remarkable discoveries is the Saola *Pseudoryx nghetinhensis* (Dung *et al.* 1993²; Schaller & Rabinowitz 1994³). Other newly discovered species, a small dark muntjac and Large-antlered Muntjac *Megamuntiacus vuquangensis* (Tuoc *et al.* 1994; Schaller & Vrba 1996) also have restricted world ranges centred on Nakai Nam Theun National Protected Area. The Indochinese Warty Pig *Sus bucculentus* was recently rediscovered in the area (Groves *et al.* 1997) after being considered extinct (Salter 1993). Field surveys indicate that mammal communities within the protected area are exceptionally diverse. At least nine species of primate occur, including four threatened taxa to which the NNT NPA represents a global stronghold (Pygmy Loris *Nycticebus pygmaeus*, Douc Langur *Pygathrix nemaeus*, Francois' Langur *P. nemaeus francoisi* and Southern White-cheeked Gibbon *Nomascus siki*).

Along one stretch of abandoned logging road above the village of Ban Navang in the NPA, 16 species of carnivore have been recorded⁴, and further species have been found elsewhere in NNT. This is the highest diversity of mammalian predators reported at a single site in Lao PDR-Cambodia-Vietnam. Included amongst these are many rare cats (Fishing Cat *Prionailurus viverrinus*, Golden Cat *Catopuma temmincki*, Marbled Cat *Pardofelis marmorata*, Clouded Leopard *Pardofelis nebulosa* and Tiger *Panthera tigris*), several of which have not been recently observed by biologists elsewhere in Lao PDR. The Nakai Plateau holds significant populations of many mammals including an estimated 100-150 Asian Elephants *Elephas maximus*; few viable populations of elephants currently exist elsewhere in Lao PDR.

In total, recent surveys have found approximately 430 bird species in Nakai Nam Theun National Protected Area (Timmins & Evans, 1996; Tizard, 1996; Tobias, 1997). This is the highest diversity of any site yet surveyed in Lao PDR, and amongst the highest recorded in protected areas across Southeast Asia. In terms of key species of conservation concern, 56 have been found in the NPA (43 residents/breeders). If it is accepted that birds provide an appropriate basis for evaluating the importance of an area to wildlife conservation (due to ease of specific identification, availability of detailed distributional data and globally standardised categories of threat), these totals establish the Nakai Nam Theun National Protected Area as the most important site yet surveyed in the Lao PDR-Cambodia-Vietnam region. The Nakai Plateau supports many threatened birds (WCS, 1995a; WCS, 1995b).

Surveys in the Nam Theun and Xe Bangfai basins indicate diverse fish communities comprising many species with restricted ranges and high conservation importance (Kottelat 1996; Roberts 1996). Although the Nam Theun was found to be less diverse than the Xe Bangfai (60 as opposed to 131 species) it contained a higher proportion of endemic species (18% as opposed to 4%; Kottelat 1996). However, as these levels of endemism may be a function of uneven survey coverage, further work is being undertaken in adjacent watersheds to clarify the distribution of local fish species. The fish fauna of upland river systems in the watershed has not been studied and is likely to add significantly to the overall diversity and conservation value of aquatic resources in the protected area.

¹ With all extensions included, the area would encompass 4,900 km².

² Dung, V. V., Giao, P. M., Chinh, N. N., Tuoc, D. & MacKinnon, J (1993). A new species of living bovid from Vietnam. *Nature* 363, 443-445.

³ Schaller, G. & Rabinowitz, A. (1994): The saola or spindlehorn bovid *Pseudoryx nghetinhensis* in Lao. *Oryx* 29:107 – 114.

⁴ **Wildlife Conservation Society** (1996): Survey of nocturnal mammals in and near the Nakai-Nam Theun NBCA. Vientiane. (unpublished report).

Nakai Nam Theun National Protected Area has a very diverse range of the principal habitats of the Sai Phou Louang (Annamite) Range. The undisturbed evergreen mixed and Fagaceous forest tracts harbour important animal and plant species. Whereas the flora awaits exploration to provide the level of detail available for mammals and avifauna, it is already known that it has a diversity of rare Gymnosperm genera, especially *Fokienia* and *Keteleeria*. There are undoubtedly many new species yet to be discovered. The pine habitat is not botanically rich, yet is of great conservation significance. It includes one of the few old growth *Pinus merkusii* habitats left in Southeast Asia, and is important for wildlife.

The large size of the protected area forms the core of a connected series of important conservation areas in both Lao PDR and Vietnam which together represent the most important protected area in the Lao PDR-Cambodia-Vietnam region. These reasons alone provide Nakai Nam Theun National Protected Area with outstanding conservation value and form the basis for recommendations that the Government of Lao PDR seek World Heritage status for the area and formally link it with other conservation areas in Lao PDR and Vietnam.

Watershed Values

The Nam Theun has two hydropower projects, namely the Nam Theun 2 Hydropower Project and the Theun-Hinboun, selling electricity to Thailand. The drainage of the protected area is generally southwest into the Nam Theun, and so the protected area forms almost the entirety of the Nam Theun watershed. This is a critical tributary of the Nam Kading, itself a major tributary of the Mekong.

Cultural Values

Nakai Nam Theun National Protected Area also represents significant cultural diversity, including several vulnerable indigenous ethnic groups. The area has a long history of human habitation by a variety of ethnic groups. These communities can be grouped according to ethnolinguistic classes which, although not equivalent, represent useful anthropological categories for planning and management. The term *Vietic* (29% of NPA population) refers to people speaking languages belonging to the Vietic branch of Mon-Khmer (Austroasiatic). To date, 17 such languages have been identified in the Nakai Nam Theun National Protected Area. *Brou* (55% of NPA population) is a single language belonging to the Western Katuic branch of Mon-Khmer. *Tai/Sek* (16% of NPA population) is the term used for all groups that speak languages belonging to the Tai-Kadai ethnolinguistic family. At least 10 are represented within the protected area.

Among the indigenous Vietic groups, considerable cultural differentiation has emerged. Their modes of production and space usage vary from foraging in small nomadic groups to a combination of swidden agriculture and sedentary irrigated rice cultivation. From the perspective of risk and vulnerability of indigenous ethnic groups, it is the upper river system Vietic groups that are most at risk. Among these, the most vulnerable groups are the Atel, the Thémrou, and the Mlengbrou, in the grouping Vietic I and characterised as “small group of foraging nomads”. These people are known to have extensive knowledge of the forest and their culture and lifestyle is intimately based upon nature:

Actually, the term “at risk” in their case is too conservative as their plight would more accurately be designated as “on the verge of extinction.” In 2003, the last remaining members of these groups (16 Atel, 30+ Thémrou, and 9 Mlengbrou), were to be found living in or near villages to which they were assigned following the official government policy of village consolidation in the 1970s.

Contact

Thong Eth Phayvanh
Director
Nakai Nam Theun National Protected Area
(Watershed Management and Protection Authority)
Nakai District

Thakek
Khammouane Province
Tel. (051) 212-099

REPORTS AND PUBLICATIONS

- Boonratana, R. (1999). Wildlife Monitoring and Participatory Conservation Techniques at Nakai-Nam Theun NBCA. WCS/IUCN. Vientiane.
- CARE. (1996). Socio-Economic and Cultural Survey of the Nam Theun 2 Project Area. CARE. Vientiane.
- Chamberlin, J. R. (1997a). *Cultural Diversity and Socio-economic Development in the Context of Conservation*. Unpublished draft submitted to IUCN "Environmental and Social Action Plan for the Nakai-Nam Theun Catchment and Corridor Areas". Vientiane.
- Chamberlin, J. R. (1997b). *Nature and Culture in the Nakai-Nam Theun Conservation Area*.
- Coudrat, C. 2013. Species distribution, abundance and conservation in Nakai-Nam Theun National Protected Area, Central eastern Laos: implications for future local wildlife conservation project. PhD thesis
- Duckworth, J.W., Salter, R.E. and Khounboline, K. (1999). *Wildlife in Lao PDR. 1999 Status Report*. IUCN, Wildlife Conservation Society, and Centre for Protected Areas and Watershed Management, Department of Forestry, Vientiane.
- Dung, V. V., Giao, P. M., Chinh, N. N., Tuoc, D. & Mackinnon, J. (1993). A new species of living bovid from Vietnam. *Nature* 363, 443-445.
- Groves, C. P., Schaller, G. B., Amato, G. and Khounboline, K. (1997). Rediscovery of the wild pig *Sus bucculentus*. *Nature* 380: 135.
- Hansel, T. and Vannalath, S. (1999). Nakai-Nam Theun NBCA Staff Training and Capacity Building on Extension Techniques for Participatory Conservation. WCS/IUCN. Vientiane.
- IUCN (1998a). Social Action Plan for the Nakai-Nam Theun Conservation Area. IUCN. Vientiane.
- IUCN (1998b). Environmental and Social Management Plan for Nakai-Nam Theun Catchment and Corridor Areas (Revision 1 - May 1998). IUCN. Vientiane.
- IUCN (1999). Nakai-Nam Theun Conservation Area Programme - Phase 2: Community Development and Biodiversity Conservation Pilot Field Activities Final Report. IUCN. Vientiane.
- Ingles, A., Saypaseuth, T., Foppes, J., Baker, J., Khetphanh, S., Bounsou, S. and Sengkeo, K. (1999). A rapid survey of the use and Government regulation of non-timber forest products from the Nakai-Nam Theun National Biodiversity Conservation Area, Central Lao PDR. IUCN. Vientiane.
- Jarvie, J. K. (1997). *Technical Report of the Botanist - Plant Ecologist* in "Environmental and Social Action Plan for the Nakai-Nam Theun Catchment and Corridor Areas (IUCN/WCS)". WCS. Vientiane.
- Kottelat, M. (1996) Potential Impact of the Nam Theun 2 Hydropower Project on the Fish and Aquatic Fauna of the Nam Theun and Xe Bang Fai Basins, Lao PDR. Cornol, Switzerland. 2 Volumes.
- Roberts, T. R. (1996) Fluvicide: an independent environmental assessment of the Nam Theun 2 hydropower project in Lao, with particular reference to aquatic biology and fishes. Bangkok.
- Robichaud, W. (1997). Saola Conservation Action Plan. IUCN/WCS, Vientiane.
- Robichaud, W. (1998). Nakai-Nam Theun Saola Conservation: Interim report after the first phase of fieldwork, 22 May to 15 June 1998. Report to IUCN. WCS, Vientiane.
- Robichaud, W. (1999). Saola Conservation Action Plan – 1999 Revision. WCS/IUCN. Vientiane.
- Robichaud, W. and Stuart, B. (1999). Summary of Saola, Herpetological and Wildlife Trade Studies in Nakai-Nam Theun NBCA and the Proposed Northern Extension. WCS/IUCN. Vientiane.
- Salter, R. E. (1993) *Wildlife in Lao PDR. A Status Report*. Vientiane: IUCN.
- Schaller, G. & Rabinowitz, A. (1994). *The saola or spindlehorn bovid Pseudoryx nghetinhensis in Lao*. *Oryx* 29: 107-114.
- Schaller, G. & Vrba, E.S. (1996). *Description of the Giant Muntjac Megamuntiacus vuquangensis in Lao*. *Journal of Mammalogy* 77(3): 675-683.

- Stuart, B. (1998a). *A Survey of Amphibians and Reptiles in Hin Nam No NBCA, East-central Laos*. Centre for Protected Areas and Watershed Management/Wildlife Conservation Society Cooperative Program, Vientiane.
- Stuart, B. (1998b). *A Survey of Amphibians and Reptiles in Khammouane Limestone National Biodiversity Conservation Area*. Centre for Protected Areas and Watershed Management/Wildlife Conservation Society Cooperative Program, Vientiane.
- Stuart, B. (1998c). *A Survey of Amphibians and Reptiles in Phou Luey National Biodiversity Conservation Area, Bolikhamxay Province, Lao PDR*. Centre for Protected Areas and Watershed Management/Wildlife Conservation Society Cooperative Program, Vientiane.
- Srisomvang, V. (1998). Recommendations on Agro-Forestry and Community Development in Ban Makfueang Village, Nakai-Nam Theun NBCA (December 1998). ECOLAO/IUCN. Vientiane. [Lao]
- Timmins, R. J. and Evans, T. D. (1996). *A Wildlife and Habitat Survey of Nakai-Nam Theun National Biodiversity Conservation Area, Khammouan and Bolikhamsai Provinces, Lao PDR*. WCS. Vientiane.
- Tizard, R. J. (1996) A preliminary wildlife and habitat survey of the proposed northern extension to the Nakai-Nam Theun National Biodiversity Conservation Area and the adjacent Nam Gnouang area, Bolikhamsai Province, Lao PDR. Vientiane: WCS.
- Thamawongsa, P. (1999). Land-Use Planning in Ban Pung. NNT NBCA/IUCN. [Lao]
- Thewlis, R. C. M., Duckworth, J. W., Evans, T. D. and Timmins, R. J. (1998). The status and conservation of threatened birds in Laos. Bird Conservation International.
- Tobias, J. (1997). *Report of the Wildlife Survey in "Environmental and Social Action Plan for the Nakai-Nam Theun Catchment and Corridor Areas (IUCN/WCS)"*. WCS. Vientiane.
- Tuoc, D., Dung, V. V., Dawson, S., Arctander, P. and Mackinnon, J. (1994) Introduction of a new large mammal species in Viet Nam. *Science and Technology News*. Forest Inventory and Planning Institute, Ministry of Forestry, Hanoi.
- Wildlife Conservation Society (1995). *A preliminary wildlife and habitat assessment of the Nam Theun 2 Hydropower Project area*. WCS/CPAWM. Vientiane.
- Wildlife Conservation Society (1996a). *A Preliminary Wildlife and Habitat Survey of the Proposed Northern Extension to the Nakai-Nam Theun National Biodiversity Conservation Area and the Adjacent Nam Gnouang Area, Bolikhamsai Province, Lao PDR*. WCS. Vientiane.
- Wildlife Conservation Society (1996b). *Survey of nocturnal mammals in and near the Nakai-Nam Theun National Biodiversity Conservation Area, Central Lao PDR, with notes on other wildlife observed and recommendations for management of the area*. WCS. Vientiane.
- Wildlife Conservation Society (1996c). *Additional surveys and recommendations on the birds and mammals for the Nam Theun 2 Hydropower Project with emphasis on the proposed Corridor and the reservoir Islands Area*. WCS. Vientiane.