

Green Growth Advisory  
Program for Lao PDR



# Lao Biodiversity: A Priority for Resilient Green Growth





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# ACKNOWLEDGEMENTS

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The Lao People's Democratic Republic (Lao PDR) is transitioning to a greener, more resilient economy. Biodiversity is a cornerstone of the country's Five-Year National Socio-economic Development Plan and the National Green Growth Strategy 2019-2030.

To support Lao PDR's ongoing transformation to a green economy, the World Bank carried out this assessment of opportunities and challenges for biodiversity in close cooperation with the Ministry of Planning and Investment (MPI), Ministry of Natural Resources and Environment (MONRE), and Ministry of Agriculture and Forestry (MAF) as an input into their planning processes underway in 2019–2020 including, among others, the Government's 9th National Socio-economic Development Plan (NSED-9), and MONRE's periodic update of the State of Environment Report of the Government of Lao PDR.

As such, this report and accompanying short policy note are outputs under the second phase of the World Bank's Green Growth Advisory Program (P171011). Sister assessments address related topics important for Lao PDR's green economy such as (a) scaling up of investment in sustainable forest management, (b) priorities for environmental management, (c) landscape valuation, and (d) promotion of nature-based tourism. Funding for the report was gratefully provided by the Korean Green Growth Trust Fund and is complemented by World Bank operating budget.

The report and accompanying policy note were prepared by a World Bank Group (WBG) team from the Environment, Natural Resources, and Blue Economy Global Practice, comprising Stephen Dango, who leads the World Bank's Green Growth Advisory Program, and John Parr, lead adviser for the World Bank Lao PDR program on conservation and protected area management.

The report and policy note have benefited from peer reviews by WBG and Global Environment Facility (GEF) Secretariat staff, including Elisson Wright (World Bank), George Henry Stirrett Wood (World Bank), and Hannah Fairbank (GEF Secretariat), who provided many helpful comments and suggestions.

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## Abbreviations and acronyms

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CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DCNEC	Department of Combating Natural Resources and Environmental Crime
DOFI	Department of Forest Inspection
EID	Emerging Infectious Disease
ESIA	Environmental and Social Impact Assessment
FAO	Food and Agriculture Organization
FLEGT	Forest Law Enforcement, Governance and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOL	Government of Lao PDR
IRRI	International Rice Research Institute
IUCN	International Union for Conservation of Nature
LCD	Lao Customs Department
Lao-WEN	Lao-Wildlife Enforcement Network
LECS	Lao Expenditure and Consumption Survey
MAF	Ministry of Agriculture and Forestry
MOH	Ministry of Health
MONRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
NAFRI	National Agriculture and Forestry Research Institute
NBSAP	National Biodiversity Strategy and Action Plan 2016-2025
NBT	Nature-based Tourism
NGO	Non-governmental Organization
NPA	National Protected Area
NSEDP	National Socio-economic Development Plan
NTFP	Non-timber Forest Product
PES	Payments for Ecosystem Services
PMO	Prime Minister's Order
SEA	Strategic Environmental Assessment
UNESCO	United Nations Educational, Scientific and Cultural Organization

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## Executive Summary

The Lao PDR sits at the intersection of four critical ecoregions and is home to some of the world's biologically richest and most endangered terrestrial and aquatic ecosystems and species. The four ecologically diverse regions comprise: (a) the Northern Highlands - a rugged mountainous region, (b) the Annamites Range - a mountainous topography with high monsoonal rainfall; (c) the Indo-Chinese karst landscapes of central Lao PDR; and (d) the Mekong plain. These characteristics combined give Lao PDR high levels of biodiversity and diverse production systems for food, fibre, and medicines.

The biodiversity endowment is crucial to the Lao economy, as the goods and ecosystem services it provides are essential to reduce poverty, secure livelihoods, and drive a greener economic growth model. Over 840,000 people in over 1,200 villages are situated within or on the boundary of 23 national reserves. The majority of these villagers, from a range of ethnic groups, are heavily dependent upon the sustainable utilization of the natural resources within these reserves. **But Lao biodiversity is in danger.** The highest priority threats to the country's biodiversity values include climate change, illegal logging, the illegal wildlife trade, infrastructure development in and around protected areas, and expansion of agriculture and settlements. Key recent legislative achievements to protect the biodiversity include Prime Minister's Order (PMO) 15 (2016), PMO 5 (2018), and the 2019 Forestry Law. On February 15, 2019, the Government re-designated some national protected areas (NPAs), establishing Nakai-Nam Theun National Park and Nam Et-Phou Louey National Park as the nation's first two national parks. In January 2020, Hin Nam No was also declared as a national park, and is short-listed to become the country's first natural World Heritage Site.

*Hin Nam No National Park is being evaluated for designation as the country's first natural World Heritage Site.*

*Photo credit: Ryan DeBoodt/GIZ.*



**Sustained investments in biodiversity conservation can be profitable, and revenues and job creation can be on par with those from the extractive industries over the long-term, although there are some short-term benefits as well.** One example is the provision of environmental services from Nakai-Nam Theun National Park to Nam Theun 2 hydropower facility. Nature-based tourism could grow in Laos from 4.2 percent of 2018 GDP and 3.5 percent of jobs to at least the global average of 10.4 percent of GDP and 10 percent of jobs. International visitors (and domestic tourists increasingly) seek experiences with pristine landscapes, unique wildlife, and the people and cultures dependent on them. There already is a significant existing regional market for nature-based tourism (NBT) at Lao PDR's doorstep. Tourism must be intentionally developed to contribute directly to conservation, prevent degradation of nature, and retain the unique features that make Lao PDR special, to benefit the Lao economy, create good jobs, and sustain nature. Other sources of revenue from biodiversity can include patents for pharmaceutical compounds, payments for ecosystem services (PES), sustainable legal timber, and food. About 67 percent of the Lao population are rural and depend on forests to support their livelihoods; over 39 percent of rural family income is from non-timber forest products (NTFPs). As much as 90 percent of the over 1,400 species of wild animals are used as protein sources by local people.

**The new Forestry Law (2019) promotes 'village forest management' over much of the forestry estate.** This decentralization of management responsibility effectively places forests designated for village use under the management of those directly dependent upon the forests for their livelihoods. The new law also provides the legal basis for promoting commercial tree plantations, which was reinforced by a subsequent Prime Minister's Decree No. 247 enacted August 20, 2019.

**The country's ongoing transformation to a green economy aims to generate economic growth and poverty reduction through sustainable solutions that boost resilience,** create jobs and livelihoods, and protect natural capital and human health. Biodiversity is an important aspect of these green growth ambitions, as articulated in the Government's National Green Growth Strategy, the 8th National Socio-economic Development Plan (NSED-8, 2016–2020), the State of Environment Report series, and sector strategies.

**Zoonotic diseases are increasingly linked to environmental change and human behavior.** The resulting transmission of disease from wildlife to humans is a hidden cost of human economic development. The emergence of infectious diseases with zoonotic origin has increased (especially those caused by pathogens originating in wildlife). In the last twenty years, China, Lao PDR, and other East Asian countries have experienced such epidemics as SARS, Highly Pathogenic Avian Influenza (HPAI, H5N1 and H7N9), re-emergence of Schistosomiasis, and the 2020 COVID-19 pandemic. Human practices are increasing exposure to wildlife, in two main ways: through legal and illegal trade, and through habitat degradation. There is a need to widen the spectrum of actions to protect human and economic health. Mitigation and management of human exposure to wildlife and wildlife products is essential to prevent the spill-over of Emerging Infectious Diseases (EIDs).

## Executive Summary

This World Bank report outlines key challenges and priority actions to ameliorate the main threats to biodiversity and to sustainably utilize the biodiversity assets to help drive Lao PDR's green economy. The report aims to add value to the Government's preparation of the 9th NSEDP (2020–2025); the upcoming 2020 State of Environment Report; and the development of sector policy, plans, and investments. The recommended priority actions are summarized below in three groups: (a) incentives, including policy, law, and markets; (b) information, including outreach, extension, and education; and (c) investments in biodiversity values.

### Priorities for policy, law, and markets

- Policies and legislation should be introduced to mitigate the spread of zoonotic diseases, such as the 2020 COVID-19. These policy and legislative measures might include: (i) increasing efforts to conserve areas rich in wildlife diversity by reducing anthropogenic activity; (ii) strengthening illegal wildlife trade enforcement through better cooperation among concerned law enforcement agencies and tools to effectively curb illegal trade and regulate legal wildlife trade, (iii) re-examining the legal wildlife trade, and (iv) creating or improving wildlife handling, transportation, and isolation facilities, wildlife breeding and rescue facilities, and (v) the markets should be better regulated and controlled.
- The Prime Minister's Decree on Protected Areas could be enhanced to reflect the strengthened commitment of the Government of Lao PDR (GOL) to the emerging national park agenda and the adoption of the internationally recognized protected area categories of the International Union for Conservation of Nature (IUCN). The Government could consider the formation of a Department of National Parks and Wildlife Conservation in the Ministry of Agriculture and Forestry (MAF) to help ensure staffing levels are adequate for the national park and protected area system.
- Regulations and procedures for tourism concessions in protected areas and other natural landscapes would benefit from clear steps and incentives for businesses to invest in NBT.
- To help protect biodiversity in village-use forests and reduce pressure on sensitive habitats and ecosystems, a regulation and implementing procedures on village forest management could be formulated by the MAF to clarify the roles at the national, provincial, and district levels in supporting decentralized 'village forest management'. Similarly, clarification of roles and responsibilities is needed for the concerned government agencies regarding the issuance of commercial plantation concessions.
- The legislative framework for interagency law enforcement cooperation could be reviewed and enhanced to help implement PMO 15 on controlling timber harvesting and PMO 5 on combating illegal wildlife trade.
- Environmental and Social Impact Assessments (ESIAs) of all proposed infrastructure projects in and around protected areas and other biodiversity-rich areas should be undertaken utilizing the Lao policy framework including the detailed 2019 Prime Minister's Decree on ESIA. Strategic Environmental Assessment (SEA) is another useful tool in the recently updated Lao policy framework to address impacts and opportunities beyond single projects, such as helping balance biodiversity protection with hydropower development.



## Priorities for outreach, extension, and education

- Continue to educate the concerned policing agencies, and the general public, about the links between the illegal wildlife trade and zoonotic diseases such as COVID-19, and the need to halt this activity with immediate effect throughout the country.
- Continue to implement customized outreach in buffer zone villages in and around protected areas and other forest-dependent villages on biodiversity conservation, zoonotic diseases and the illegal wildlife trade, and natural solutions to climate change.
- Empower ethnic peoples to conserve and utilize their traditional ecological knowledge in protected area management
- Undertake outreach by protected area staff to partner with other law enforcement agencies involved with forest and wildlife-related crime. Mainstreaming biodiversity into education and learning to help create the awareness needed for conservation.
- Promote research on different biodiversity aspects by relevant government research institutes, Lao universities, and concerned non-governmental organizations (NGOs).
- Develop an environmental education strategy, building on the 'Environmental Education and Awareness Vision for 2030, National Strategy for 2018–2025, and Mission for 2018–2020' No. 6256/MONRE (December 4, 2018).

## Priority investments in biodiversity values

- Investments in the environmental police, and other concerned law enforcement agencies, to halt illegal wildlife trade within the country, including through proactive prosecutions.
- Investments in villages located in the protected area buffer zones could be strengthened by MAF using poverty reduction funds, rural development NGOs, and co-funding measures.
- Invest in building institutional capabilities in protected area management, village forest management, and interagency law enforcement collaboration.
- Building a strategic investment platform for landscapes would be valuable at the national and subnational levels to inform investment decision making and help manage trade-offs and identify mutual opportunities among diverse activities and projects in the landscape.
- Investments in the national park and protected area system could be strengthened by diversifying revenue into each reserve, including the establishment of sustainably managed private conservation and NBT concessions.
- Promote only best-practice socially and environmentally sustainable commercial plantation investment in appropriate, degraded land outside conservation forests and other preserves, to reduce pressure on natural forest, protected areas, and wildlife.
- Develop village forest management outside protected areas to help operationalize good working relationships between provincial and district offices and villages in terms of allocating management responsibilities, protecting village forests, and enhancing sustainable village livelihoods and biodiversity assets.
- Multi-agency law enforcement actions to monitor and disrupt the illegal timber and wildlife trade are important as both the protected area system and village forest management are Government priorities since the enactment of PMO 15, PMO 5, and the 2019 Forestry Law.

# 1 Introduction

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- 1. The diversity of life is essential for human welfare.** Most of nature's contributions to people and economic development are not fully replaceable, and some are irreplaceable. The Lao People's Democratic Republic is home to some of the world's biologically richest and most endangered terrestrial and aquatic species. Lao PDR is situated in the center of the Indo-Burmese Hotspot<sup>1</sup> and is in one of the 10 most important global biodiversity ecoregions. This biodiversity endowment is crucial to the Lao economy, as the goods and ecosystem services it provides are essential to reduce poverty and secure livelihoods. Over 840,000 people in over 1,200 villages are situated within or on the boundary of 23 national reserves. The majority of these villagers, from a range of ethnic groups, are heavily dependent upon the sustainable utilization of the natural resources within these reserves. For Lao PDR to deliver sustainable development outcomes, poverty reduction, and greener economic growth, it is essential that its biodiversity is protected and sustainably used. In addition, the careful management of biodiversity and the services it provides can help people adapt to and mitigate climate change and reduce risks of floods and droughts.
- 2. Zoonotic diseases are increasingly linked to environmental change and human behavior.** The disruption of wildlife habitats and primary forests are bringing people into closer contact with animal species. The resulting transmission of disease from wildlife to humans is a hidden cost of human economic development.<sup>2</sup> The emergence of infectious diseases with zoonotic origin has increased (especially those caused by pathogens originating in wildlife). In the last twenty years, China, Lao PDR, and other East Asian countries have experienced such epidemics as SARS, Highly Pathogenic Avian Influenza (HPAI, H5N1 and H7N9), the re-emergence of Schistosomiasis, and the 2020 COVID-19 pandemic. Human practices are increasing exposure to wildlife, in two main ways: through legal and illegal trade, and through habitat degradation. There is a need to widen the spectrum of actions to protect human and economic health. Mitigation and management of human exposure to wildlife and wildlife products is essential to prevent the spill-over of EIDs.

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1 An ecosystem profile of the Indo-Burma Biodiversity Hotspot was prepared by a consortium including BirdLife International, Indochina Conservation International-China Program, Kadoorie Farm and Botanic Garden, Samdhana Institute, and Yunnan Green Environment Development Foundation. 2012.

2 Vidal, John (18 March 2020). "<https://www.theguardian.com/environment/2020/mar/18/tip-of-the-iceberg-is-our-destruction-of-nature-responsible-for-covid-19-aoe> "

The Guardian. "<https://www.worldcat.org/title/guardian/oclc/1056142271> " Retrieved 18 March 2020.



*Nakai-Nam Theun National Park protects the largest area of wet evergreen forest in the Annamites and its unique biodiversity. Photo credit: Camille Coudrat/Association Anoulak*

- 3. Conservation is a long-term investment.** Sustained investments in biodiversity conservation can be profitable, and revenues and job creation can be on par with those from extractive industries or other sectors. For example, nature-based tourism (NBT<sup>3</sup>) is often a cornerstone of biodiversity investments. NBT is the largest market-based financial contributor to protected areas. Tourism represents approximately 20 percent of Thailand's gross domestic product (GDP) but only four percent of Lao's GDP. NBT could grow in Laos from 4.2 percent of 2018 GDP and 3.5 percent of jobs to at least the global average of 10.4 percent of GDP and 10 percent of jobs. International visitors (and domestic tourists increasingly) seek experiences with pristine landscapes, unique wildlife, and the people and cultures dependent on them. To support biodiversity in Lao PDR over the long term, tourism must be developed in such a way that it has low impacts and generates revenue that is returned back into conservation efforts. Other sources of revenue from biodiversity can include patents for pharmaceutical compounds, payments for ecosystem services (PES), sustainable legal timber, and food. The World Bank is supporting several Lao PDR institutions to economically value landscapes as part of a global effort to quantify natural capital.
- 4. Recognizing this opportunity, the GOL has been actively pursuing a green growth path that includes biodiversity values.** This report is an input into that process and was prepared under the World Bank's Green Growth Advisory Program, which supports information, investment, and policy development among diverse GOL institutions. The country's ongoing transformation to a green economy aims to generate economic growth and poverty reduction through sustainable solutions that boost resilience, create jobs and livelihoods, and protect natural capital and human health. Biodiversity is an important aspect of these green growth ambitions as articulated in the National Green Growth Strategy, the 8th National Socio-economic Development Plan (NSED-8), the State of the Environment Report series, and sector strategies. This report aims to add value to the Government's preparation of the 9th NSED; the upcoming 2020 State of Environment Report; and the development of sector policy, plans, and investments.

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<sup>3</sup> Nature-based tourism (NBT) is a continuum of tourism products, some of which are more desirable and sustainable than others, and includes ecotourism. NBT products also involve tangible and intangible cultural heritage associated with natural heritage and the human experience across the landscape.

## 2 The significance of Lao PDR's biodiversity endowment

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- 5. Lao PDR has extremely high biodiversity values**, comprising four physiographic regions with very different agro-climatic characteristics: (a) the Northern Highlands - a rugged mountainous region with a dry sub-tropical climate; (b) the Annamites Range - a mountainous topography with high monsoonal rainfall; (c) the Indo-Chinese karst landscapes of Central Lao PDR; and (d) the Mekong Plain - an alluvial plain along the Mekong and its larger tributaries with a tropical monsoon climate and variable rainfall. These characteristics combined give Lao PDR high levels of biodiversity and diverse production systems for food, fibre, and medicines.
- 6. Lao PDR supports a rich diversity of both floral and faunal species.** There are an estimated 8,000–11,000 species of flowering plants, many of which are economically valuable. These plants have a range of utilities for people and include non-timber forest products (NTFPs) and medicinal plants, as well as economically important agricultural species, breeds, and varieties. Among the fauna, between 150 and 200 species of reptiles and amphibians, 700 species of birds, 90 species of bats, over 100 species of large mammals, and 500 species of fish have been described for Lao PDR according to the National Biodiversity Strategy and Action Plan 2016-2025 (NBSAP). More is known about large mammals and birds and new species are still being discovered. Reptiles, insects, and rodents are poorly documented.
- 7. The national extirpation of large species in Lao DPR indicates that the country's natural ecosystems and the people who rely on them are already suffering from a depletion of the nation's biodiversity.** Species that are either nationally extinct or critically endangered include top predators (Tiger, Leopard), large herbivores (including Saola, Kouprey, and two species of rhinoceros), and large aquatic species (Irrawaddy Dolphin, Giant Siamese Catfish). In addition, there are dramatic depletions and likely extirpations of many other species through illegal wildlife trade, transboundary snaring, or other exploitation pressures.
- 8. Lao PDR is the region's most ethnically diverse country, with 49 distinct ethnic groups.** The farming and livelihood practices of these different ethnic groups vary significantly, producing a rich cultural dimension to agro-biodiversity in the country, much of which is not yet properly understood or recorded. Globally, ethnic diversity and biological diversity are closely correlated, and traditional knowledge is a key asset for managing biodiversity for conservation and sustainable productive use. There is a risk that unknown species are being lost that could be economically valuable in the future, such as for pharmaceutical use.



Photos 1-6. A range of medicinal tubers found in forests of northern Lao PDR.  
Photo 7. *Amanita pantherina*.  
Photo 8. *Mycoamaranathus cambodgensis*.  
Photo credits: Chris Flint/TABI.

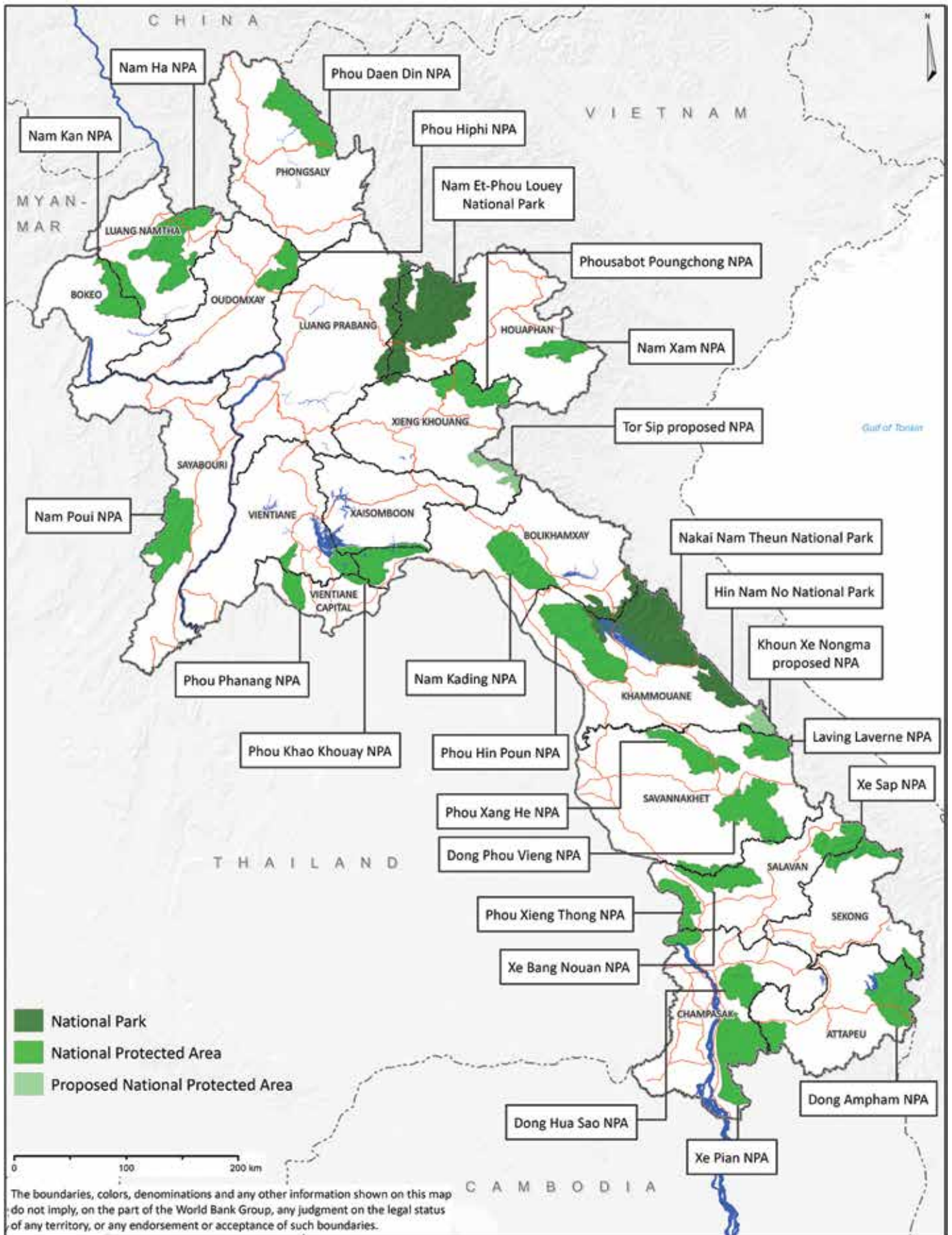
Photo 9. The orchid, *Vanilla aphylla*, in Phou Khao Khouay National Protected Area.  
Photo credit: Bertrand Laville.

### 3 The state of the policy environment for biodiversity and wildlife in Lao PDR

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9. **The new National Green Growth Strategy 2030 of Lao PDR (2019) charted a more sustainable development path that prioritizes NBT, sustainable forestry, and downstream industries as important growth drivers for the next five-year NSEDP and beyond.** The Lao Government emphasized green growth and its contribution to long-term social economic development goals with its vision to 2030 along with its 10 Year Strategy (2016–2025) and NSEDP-8 (2016–2020) and is preparing NSEDP-9.
10. **Lao PDR is a signatory to a number of international conventions relevant to biodiversity.** The most important of these include the Convention on Biological Diversity, the Strategic Plan for Biodiversity 2011–2020 including Aichi Biodiversity Targets, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Ramsar Convention. It is also a signatory to the Nagoya Protocol, the Treaty on Plant Genetic Resources for Food and Agriculture, and the Global Action Plans for plant and animal genetic resources. Lao PDR plays an active role in the Food and Agriculture Organization (FAO) Commission on Food and Agriculture Genetic Resources through its membership on the forestry, animal, and plant subcommittees.
11. **The Government has shown greater political will in recent years to the long-term sustainable management of biodiversity.** Government commitment, focusing on forest conservation and protection and combating illegal logging, fishing, and wildlife trade, has strengthened dramatically over the last couple of years. This increased commitment has yielded transformational natural resource legislation and policies. Key legislative accomplishments include (a) Prime Minister's Order (PMO) 15 enacted on May 13, 2016; (b) PMO 5 dated May 8, 2018; and (c) the revised Forestry Law enacted in 2019, as well as the Law on Water and Water Resources (2017). PMO 15 strengthened the strict management and inspection of timber harvesting across the country. This had an immediate nationwide impact on halting the flow of illegal timber across Lao PDR's porous international borders. PMO 5 further strengthened the strict management and inspection of endangered wild fauna and flora. These two milestone PMOs provided the policy framework for drawing the laws and regulations of the Government in line with both the Forest Law Enforcement, Governance and Trade (FLEGT) agreement and CITES. More pertinently, these two pieces of legislation had a major psychological impact on the citizens of the country regarding biodiversity conservation. Of equal significance, they catalyzed new thinking to enhance management of the extensive forestry estate in Lao PDR. For example, village forestry is enabled in the new Forestry Law, which could be a positive contribution to the conservation and sustainable use of biodiversity.

## The Protected Area System of Lao PDR, as of March 2020



Map credit: Chanthavone Phomphakdy.

**12. Tentative steps toward establishing a national park system.** The national protected area system of Lao PDR has been the cornerstone of the country's ongoing efforts to protect terrestrial biodiversity over the last 25 years. Initiated in October 1993, the country rapidly established an extensive system of conservation landscapes (IUCN<sup>4</sup> Category VI: landscapes), termed national protected areas (NPAs), which initially comprised 18 protected areas, and by 2018 had reached a total of 23 preserves, covering 3.8 million ha, or 15.1 percent of the total area of the country according to the country's NBSAP. These 23 NPAs receive up to a maximum of US\$5,000 per NPA unit annually, hindering staffing levels and the achievement of conservation objectives. No accurate annual financial estimates have been calculated to manage these expansive protected areas effectively. These calculations would have to consider both the complex collaborative management systems adopted within the country, as well as the scale of livelihood development interventions required to maintain sustainable livelihoods within large numbers of buffer zone villages.

**13. The main purposes of establishing and managing the protected areas include**

- (a) Protection in perpetuity of the biodiversity represented in the country, having high regard for its international, regional, and national values;
- (b) Provision of natural resources that may be extracted on a limited and sustainable basis, that is, at harvest rates that do not exceed the long-term rate of regeneration, by and for the benefit of the local communities;
- (c) Provision of opportunities for scientific research, education, recreation, and tourism, provided that these activities shall not significantly compromise the purposes listed above;
- (d) Natural regulation of the biophysical environment, including the composition of the atmosphere and climate, the protection of watersheds and soil, and the prevention of erosion;
- (e) Maintenance of the ecological services and processes of natural ecosystems, such as pest control, pollination, seed distribution, and natural regeneration;
- (f) Protection of areas of geological, historic, cultural, or religious significance; and
- (g) Protection of scenic landscapes.



*The orchid *Luisia filiformis*, is found in Phou Khao Khouay National Protected Area.  
Photo credit: Bertrand Laville.*

4 IUCN: International Union for the Conservation of Nature.



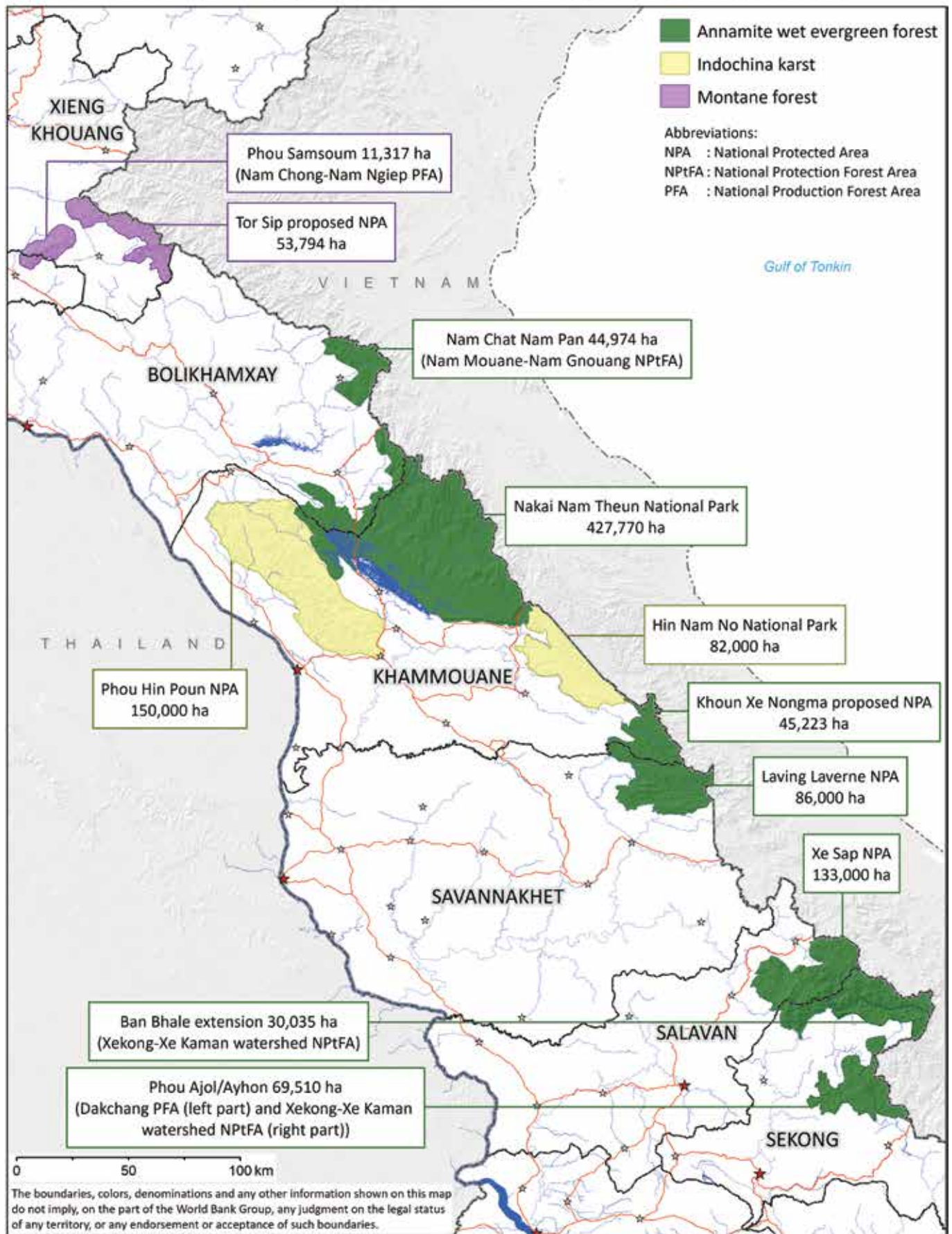
14. In August 2018, the Government placed the protected area system under the direct management of the Department of Forestry within the MAF.
15. On February 15, 2019, the Government re-designated some NPAs, establishing **Nakai-Nam Theun National Park and Nam Et-Phou Louey National Park, the nation's first two national parks**, in accordance with Category II<sup>5</sup> following the IUCN Guidelines for Applying Protected Area Categories (Dudley 2008). Hin Nam No, which is the preeminent example of Indo-Chinese karst, became the country's third national park in January 2019 and is short-listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) to become the nation's first natural UNESCO World Heritage Site. The Department of Forestry is conducting feasibility assessments of a further six NPAs for re-designation as national parks. These re-designations promote increased Government commitment to these sites in terms of human and financial resources and raise the profile to both international and national visitors.



*A small population of the endangered Eld's deer is confined to the dry dipterocarp forests in Savannakhet province.  
Photo credit: Phaivanh Phiapalath.*

<sup>5</sup> Category II protected areas (national parks) are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.

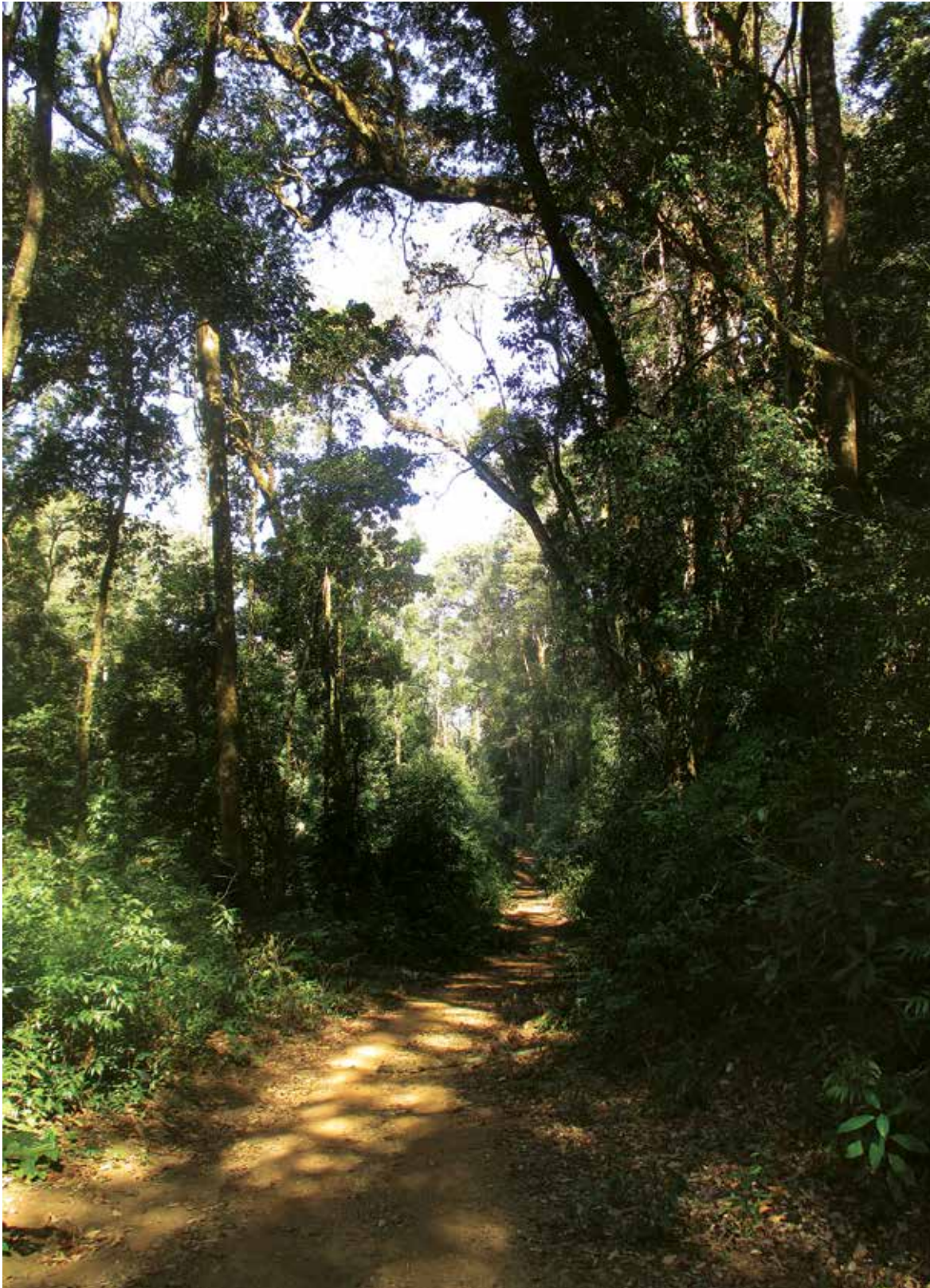
## The location of some key terrestrial sites of international conservation value in Lao PDR



Map credit: Chanthavone Phomphakdy.

## 4 The state of internationally significant biodiversity in Lao PDR

- 16. The most significant international conservation values in Lao PDR are summarized in this section.**
- 17. The wet evergreen forest** ecosystem has the highest significance and biodiversity importance and priority among the Lao forest ecosystems. This is because (a) wet evergreen forest ecosystems are particularly rich in biodiversity, with high proportions of distinctive taxonomic groups; (b) there are very few wet evergreen forest ecosystems globally; (c) Lao PDR accounts for a highly significant proportion of the global range of wet evergreen forest (only Vietnam has a significant proportion of this forest type); and (d) wet evergreen forest ecosystems are under tremendous threats, particularly from intensive snaring of terrestrial fauna.
- 18.** Wet evergreen forests within the Annamites have high significance for the global conservation of biodiversity found in this ecosystem, which is restricted to Lao PDR and Vietnam. The most important wet evergreen forest in Lao PDR is in the headwaters of the Nam Chat and Nam Pan Rivers. This site is significant for the long-term conservation of wet evergreen forest in Lao PDR and is irreplaceable. Other significant examples of wet evergreen forest in Lao PDR are in Nakai-Nam Theun National Park, Khouan Xe Nongma Provincial Protected Area, Xe Sap NPA, and forest areas of Xe Kong to the south of the Xe Sap NPA. To date none of the protected areas in the Annamites have been assessed or nominated as a natural World Heritage Site. There is a good opportunity for pursuing the designation of a serial natural World Heritage Site nomination for several of the sites (World Heritage Centre 2017).
- 19. Indo-China karst.** The ecosystem with the second highest global biodiversity importance in Lao PDR is the massive karst formations of central Lao PDR, best represented in Hin Nam No NPA and Phou Hin Poun NPA. The western dryer karst is ecologically different from the wetter eastern karst. The rugged karst terrain gives them a degree of protection, resulting in a somewhat lower priority than typical forest ecosystems, for protection and management. The main threat to this ecosystem comes from quarrying, which is a prevalent activity in Phou Hin Poun NPA.
- 20. Montane forests.** The third most significant forest ecosystem is the montane forests found in the Greater Annamites. This ecosystem has lower priority because the threats to the biodiversity from snaring are lower, but its global biodiversity conservation significance is high due to a high representation of species with restricted ranges in the montane forests. The most important montane areas are those on the border with Vietnam in Xieng Khouang Province and those to the south of Xe Sap NPA in Xe Kong Province.



*Phou Samsoum (2,640 metres) is the third highest mountain in the country, protecting montane forest biodiversity.  
Photo credit: John Parr.*

- 21. Significant wetlands.** Lao PDR designated two sites as Wetlands of International Importance (Ramsar Sites) in 2010. Beung Kiat Ngong Wetlands in Champasak Province cover 2,360 ha and lie partly within the Xe Pian and Dong Hua Sao NPAs. This important wetland complex includes swamps, lakes, and marshes and is the only place in Lao PDR where peatland areas are found. The Xe Champhone Wetlands in Savannakhet Province encompass 12,400 ha of marshes, swamps, and flooded woodland forest. The site is an outstanding example of a river with many oxbow lakes, deep pools, and mats of dense floating vegetation and is rare in Lao PDR. It supports the largest population of the critically endangered Siamese Crocodiles (*Crocodylus siamensis*) in the country.
- 22. The development and sustainability of the emerging national park system are highly dependent upon the unique biodiversity values and the capacity to promote NBT.** At the same time, it is important to caution that although NBT can be a significant source of funds for the emerging national parks, it is usually insufficient to generate sufficient funds to manage and operate protected areas. Fortunately, landscapes with outstanding biological diversity have been found within central Lao PDR, which could easily form the foundations for the development of NBT within the country. For example, Khammouane Province contains the best representation of Annamites wet evergreen forests as well as the country's representation of Indo-Chinese karst.

#### 4.1 Biodiversity values of tourism in Lao PDR

- 23. Lao PDR has the opportunity to promote greener economic growth that creates jobs by investing in its tourism sector,** especially NBT. NBT could grow in Laos from 4.2 percent of 2018 GDP and 3.5 percent of jobs to at least the global average of 10.4 percent of GDP and 10 percent of jobs. International visitors (and domestic tourists increasingly) seek experiences with pristine landscapes, unique wildlife, and the people and cultures dependent on them. With over half of Lao PDR's total wealth found in natural capital, the country's comparative advantage in tourism is its landscapes and the wildlife and people dependent on them. This endowment supports globally significant biodiversity and forest cover is 58 percent of the country's total area. Lao PDR's outstanding natural ecosystems are endowed with globally significant biodiversity and world-class caves, rivers, and waterfalls. With the right investment, capacity, and controls, this natural wealth can be harnessed to promote investment opportunities that support NBT for greener economic growth (WBG and GOL 2019b).
- 24. There already is a significant existing regional market for NBT at Lao PDR's doorstep.** In 2018, tourism to Asia grew by 8 percent, a significant increase in comparison with the global average of 6 percent, while inter-Asian tourism grew by an even greater number of 10 percent. China was a major driver of growth in the region (+13 percent) and is projected to continue its importance for Lao PDR tourism with the opening of the China-Lao PDR Railway in 2021. Thai tourists continue to be the largest market for Lao PDR, especially its many waterfall attractions in the south. The Malaysian market also holds potential for the future, with increasing flight and rail connectivity. The millennial market, which has a 40 percent global share and an above-average share of female travellers, is another important market both regionally and globally. Lao PDR is already part of a regional tourism circuit and regional markets can increasingly provide longer-term economic sustainability with rising regional incomes (WBG and GOL 2019b).



*Breath-taking nature-based tourism in the Indochinese karst of Khammouane Province.  
Photo credit: Green Discovery Laos.*

**25. For tourism to benefit the Lao economy, create good jobs, and sustain nature, it must be intentionally developed to contribute directly to conservation, prevent degradation of nature, and retain the unique features that make Lao PDR special.** Private sector investment and well-managed eco-tourism businesses should be promoted in the protected areas both as a conservation strategy and as an economic development tool in cooperation with communities. Key factors to be addressed to effectively develop and market the natural assets include strengthening public-private partnerships, addressing infrastructure investments, and increasing capacity to service the market. Long-term management and planning of tourism should be promoted that aims to create significant and equitable socio-economic benefits for buffer zone communities, women, and disadvantaged people who are key stakeholders of the protected area's resources. The development of tourism inside protected areas should also ensure that it is managed in a manner that does not negatively affect sensitive ecosystems, wildlife, or the environment. In addition, the information about a protected area should be adequate to educate the public and visitors about the area's values and importance.

## 4.2 Biodiversity values for Lao PDR villages in the forest landscape

- 26. Production of food, fuel, fiber, and medicine depends on six major agro-ecological zones in Lao PDR**, each with highly diverse subsystems comprising rich species mixes of plants, animals, fungi, and microorganisms. While rotational shifting cultivation (or swidden farming ) is a traditional farming method that helps maintain the agro-biodiversity values, increases in population and/or commercial upland cropping can lead to forest loss via pioneering cultivation.
- 27. About 67 percent of the Lao population are rural and depend on forests to support their livelihoods; over 39 percent of rural family income is from NTFPs** (WBG and GOL 2019a). This rural population relies heavily on the forest for food, fuel, fibre, medicines, and shelter. Non-timber forest products—often abbreviated NTFPs—are defined as “all biological materials (excluding timber) collected from natural or man-made forests and riverine habitats used to support local livelihoods” (NAFRI 2007) and comprise over 700 species of wild plants and fungi used for food and other purposes. These include wild vegetables, bamboo, shoots, tubers, wild fruits, sugar palm, and mushrooms.
- 28. As much as 90 percent of the over 1,400 species of wild animals are used as protein sources by local people according to Lao PDR’s NBSAP.** This includes numerous species of mammals, fish, frogs, snakes, shrimp, soft-shelled freshwater turtles, crabs, and insects, which constitute the major source of protein and household income in many areas of Lao PDR. Fisheries alone account for 50 percent of Lao PDR’s protein intake.
- 29. Medicinal plants, a type of NTFP, are also of great importance, serving as the backbone of primary health care in the country.** A database at the Institute of Traditional Medicine of the Lao PDR Ministry of Health (MOH) includes between 2,000 and 3,000 species of plants reported as used for medical treatment. New medicinal species are being recorded continuously. A majority of the 1,700 species collected are from forest ecosystems; many of these are endangered species. Some 20 species are cultivated. Both wild species and cultivated species are exported (Soejarto et al, 2014).
- 30. The economic role of NTFPs is impressive but undervalued.** Collectively, these forest products constitute a vital economic resource and provide an essential contribution to the consumption and income of the rural poor, as well as the conservation of biodiversity, soil, and water values. Cash income from NTFPs in production forests was estimated to be worth, on average, US\$204 per rural household in 2010 (Foppes and Samontry 2010). The non-cash income, that is, value of household consumption was estimated to be US\$489. Together, the total income per household comes to US\$693 per household. With approximately 73 percent of the country’s population living in rural areas, their combined NTFP income (cash and non-cash) could be worth as much as US\$510 million per year, which is equivalent to about 9 percent of the national GDP in 2010, when the assessment was undertaken.

**31. Rural villagers also exploit the forests for fuelwood.** An analysis of the Lao Expenditure and Consumption Survey 2012–2013 (LECS 5) data found that 19 percent of 432 rural households in Khammouane Province utilize fuelwood from their own forests while 91 percent of these rural households in the province utilize fuelwood from other forest sources. Around 33 percent of households now use charcoal as the main cooking fuel (approximately 800 kg per household per year). A total of 64 percent of households in the province use wood as the main cooking fuel (approximately 2 tons per household per year). Approximately 6 m<sup>3</sup> of wood is required to produce one ton of charcoal.

### 4.3 Biodiversity values of village forest management and commercial forest plantations

**32. Placing some of the forests under local village stewardship.** The new Forestry Law (2019) promotes village forest management over much of the forestry estate, as follows:

“The government shall allocate those forests and forestland areas to the provincial administration authorities, and then the provincial level shall allocate them to the district administration authorities, and then the district level shall allocate them to village administration authorities to be responsible for management, inspection, preservation, development and utilization strictly in accordance with laws.”

**33.** This handover of responsibility effectively places the forests under the management of those directly dependent upon the forests to sustain their livelihoods. The villagers effectively are allowed to manage their own natural resources. Village forest management also provides a legal platform upon which to strengthen the links between agriculture and forests in the context of climate change (that is, about the role of forests in enhancing the resilience of an agricultural subsector) and to examine the implications for developing and enhancing resilience to climate change in Lao PDR (Russell et al. 2015). This paradigm shift in management responsibility for the forestry estate permits the forest managers to be directly on site and requires less budget than if it is directly managed by off-site government officials. However, this management shift requires prioritizing training for district officials on delivering extension services to help build local villager capacities to implement sustainable forest management. The devolution of management responsibilities to villagers can sometimes lead to deforestation through unwise conversion to other land uses and unsustainable management practices.

**34. Supporting rural village livelihoods with commercial plantations.** Along with promoting village forest management, the Government has focused attention on promoting commercial plantations, involving the private sector. On August 20, 2019, Prime Minister’s Decree No. 247/PM was issued regarding commercial tree plantation promotion. Through this policy, the Government aims to promote tree planting and NTFPs by individuals, households, legal entities, and organizations. These mechanisms can diversify villager incomes and enhance local employment in the plantation sector, involving private sector engagement. However, the promotion of commercial tree plantations can often be a primary threat to biodiversity. For example, rubber plantations have expanded rapidly in Lao PDR in the last decade. The nation is currently one of the top 15 natural rubber exporters and posted gains from 2013 to 2017 (up 388 percent). The Lao rubber sector is intricately



linked to the rubber sectors of China and Vietnam. The Nam Ha NPA has become so fragmented because of rubber plantations and agricultural development that it no longer meets the international criteria to warrant national park designation, without boundary modification.

**35. The forest estate includes 64 important large watersheds, with 87 percent of the country considered to be upland terrain.** Nearly 91 percent of the Lao PDR landmass drains into the Mekong, while the remaining 11 percent drains into Vietnam from Houaphanh and Xieng Khouang Provinces. Watershed management, and protection of forest biodiversity, has been strongly promoted in association with the larger hydropower dam initiatives. Given the economic importance of these watersheds, the GOL is considering formulating PES legislation to help protect biodiversity from forest degradation or encroachment.

#### 4.4 Biodiversity values of aquatic ecosystems

**36. Approximately 70 percent of all farming households fish on a seasonal basis, generating and diversifying household income, protein, and nutrition sources.** Lao PDR's 945,000 ha of rivers, waterbodies, and other natural and constructed wetlands provide fish and other aquatic animals worth an estimated US\$101 million per year for household subsistence, income, and small-scale trade, an average of US\$106 per ha. Inland fish and other aquatic animals make up 48 percent of the animal protein consumed by the people. Approximately 35 percent of all water in the Mekong River originates from watersheds within Lao PDR. The Mekong and its 14 tributaries<sup>6</sup> have an approximate water surface area of 254,150 ha. The total surface water standing is at 55,000 m<sup>3</sup> per capita annually, the highest among all Asian countries. The GOL expects to tap a substantial portion of this water for hydropower energy generation as a major source of revenue.

**37. Fish diversity in the Mekong River is estimated to be roughly three times that of the Amazon River, and almost all the fish caught in Lao PDR are indigenous species.** The Mekong Fish Database of the Mekong River Commission in 2003 listed 898 indigenous species and 26 exotic species in 2003 (Mekong River Commission 2013). In Lao PDR, more than 481 species were identified by Kottelat (2001), including 22 species identified as exotic species. Additional fish assessments were completed in the Nam Theun and Xe Bang Fai basins showing the presence of 191 species. In 2007, monitoring of fish catches in more than 304,704 ha of the river systems showed a production of up to 21,329 tons. However, monitoring the fisheries in all the river systems throughout Lao PDR requires a massive amount of work on data collection and on statistical analysis and evaluation.

**38. Fish constitutes a major source of protein,** with rural households consuming 3.2 kg of fish each week, based upon analysis of LECS 5 fishing data available from the Lao Statistics Bureau. Fishing by both rural and urban populaces were analysed in Khammouane province in LECS 5. The analysis found that 80 percent of 432 rural households and 54 percent of 112 urban households fished in rivers. Approximately 81 percent of rural households reported that they fished in lakes, reservoirs, and/or swamps. Around 61 percent of rural households and 23 percent of urban households reported that they fished in seasonal flood plains/rice paddies. Rural households reported that they spent 1.4 hours per household per day on fishing throughout the year, while urban households spent only 1.1 hours per household per day on fishing.

<sup>6</sup> The Nam2 Tha, Nam Ou, Nam Beng, Nam Xeuang, Nam Kham, Nam Ngum, Nam Ngiep, Nam San, Nam Kading, Xe Bang Fai, Xe Bang Hieng, Xe Bang Nouan, Xe Don, and Xe Kong.

## 4.5 Biodiversity values of agriculture

- 39. Lao PDR has to feed almost 50 percent more people now than 16 years ago, and this requires genetic diversity.** The population of the country has increased 2.5 percent per year in recent years, a growth rate that can put pressure on food production systems. One of the most important systems is rice. Lao PDR is particularly rich in rice varieties. Since 1996, the National Agriculture and Forestry Research Institute (NAFRI) and the International Rice Research Institute (IRRI) have collaborated in the collection of 237 accessions (samples) of wild rice, representing at least five wild species, and more than 14,000 accessions of cultivated varieties, representing a potential of some 3,000 varieties. Glutinous rice is the staple rice type favored in Lao PDR, and around 85 percent of the samples are glutinous varieties reflecting a potential impressive diversity. Some local varieties, previously in decline, are now finding favor in national and international markets. In particular Khao Kai Noi (little chicken rice), an aromatic glutinous rice variety, has found niche outlets in both domestic and international markets and is now enjoying a strong resurgence.
- 40. The role of aquatic rice field species in rural diets in Lao PDR is underestimated, as almost 200 species are consumed, supplying a range of nutrients needed by the villagers.** The elements of the wet-rice ecosystem, in particular aquatic animals, including fish, amphibians, crustaceans, molluscs, and insects, form an important part of the Lao diet. The aquatic animals consumed by rural people contain high amounts of protein (11.6–19.7 percent for fish, crustaceans, molluscs, amphibians, and insects and 3.3–7.8 percent for fermented fish) and a generally acceptable essential amino acid profile (Nurhasan et al. 2008). They are also excellent sources of calcium, iron, and zinc. However, they have low contents of fat (0.1–4.6 percent), fatty acids, and vitamin A. Essential amino acids, iron, and zinc are nutrients that are scarce in rural Lao diets. As the food supply of rural households in rice farming areas of Lao PDR is critically dependent on the environment, aquatic animals in rice fields are important for nutrition.

## 4.6 Biodiversity values of urban ecosystems

- 41.** Urban development patterns in Lao PDR involve rapid changes in land use including the loss of productive agricultural lands and increasing consumption of energy and natural resources. Urban centers become dependent on the integrity of their water catchment areas, for which the forestry sector can provide major benefits that range from water filtration to prevention of watershed degradation and erosion management. The interactions between the urban populations and their urban ecosystems also refer to their immediate natural and physical environment. Urban ecosystems are particularly important in major cities (for example, Vientiane, Luang Prabang, Thakek, Savannakhet, and Pakse); medium-size provincial capitals (for example, Luang Namtha and Paxxan); and small district capitals (for example, Vang Vieng). The way people live in urban areas also directly influences the degree of utilization of the natural resources within a country. Environmental education becomes more important, to orient these urban societies about nature and environmental issues. Urban centers represent opportunities to set up ex-situ conservation sites for important flora and fauna species (for example, botanical gardens). Examples of urban parks in Lao PDR include Chao Anouvong Park, Chao Fa Ngum Park, Chao Saysetha Park, Natural Cultural Park, Patouxay Park, and That Luang Park in Vientiane Capital. Another outstanding site of nature education potential is Nong Kengsan in Haisaphong District.

## 5 Key threats to biodiversity values

**42. The highest priority threats to biodiversity values include climate change, illegal logging, illegal wildlife trade, infrastructure development in and around protected areas, and expansion of agriculture and settlements.** The high priority threats are described in this section.

**43. Climate change.** In Lao PDR, climate change involves raised average temperatures and contributes to unseasonal frost on mountain tops, landslides and soil erosion, flooding, and drought. These changes have a wide range of impacts on biodiversity at the ecosystem and species levels, including accelerated ecosystem succession, habitat degradation, change in the timing of key life events, changing habitat conditions, and increasing vulnerability to pests and natural disasters. An IUCN project conducted a climate change vulnerability assessment at the Ramsar site, Beung Kiat Ngong, one of the largest peatlands in the country, to understand how climate change impacts will affect species, habitats, and livelihoods (Meynell et al. 2014). Results show that changes in rainfall will negatively affect Beung Kiat Ngong, and increased temperatures will disproportionately affect the reproductive success of turtles and other reptiles. Communities surrounding the wetlands will experience drought and flooding, affecting rice agriculture, their main source of income (IUCN 2019).



*The critically endangered Saola is confined to the wet evergreen forests of the Annamites.  
Photo credit: Ban Vangban village/WCS/W. Robichaud.*



*Great Hornbill – found in a range of forest habitats.  
Photo credit: Camille Coudrat/Association Anoulak.*



*Lao Langur – endemic to Indo-Chinese karsts in Lao PDR.  
Photo credit: Phaivanh Phiapalath.*



*A pit-viper, *Trimeresurus truongsongensis*, is found in Indo-Chinese karst forests.  
Photo credit: Peter Brakels/IUCN.*



*Pseudocalotes poilani.  
Photo credit: Peter Brakels/IUCN.*



*Annamite striped rabbit – endemic to the wet evergreen forests.  
Photo credit: Robert Timmins.*



*Gracixalus quangii.  
Photo credit: Peter Brakels/IUCN.*

**44. Through its contribution to ecosystem services, the protection and sustainable use of biodiversity play a key role in boosting the climate resilience of natural systems and the rural economy.** With its sensitive mountainous terrain and large agrarian population, Lao PDR is particularly vulnerable to climate change, and increasing climate risks are placing further pressure on the environment and biodiversity. Floods, droughts, epidemics, and infestations occur regularly, and increasingly frequent climate-related hazards are anticipated as a result of climate change. By maintaining high levels of biodiversity, the country will be in a better position to adapt to extreme weather events that are expected to increase in the future.

Illegal logging occurred in all forested lands, including protected areas, within the country until very recently. A 2015 study from the World Wildlife Fund (Smirnov 2015) estimated the extent of the international illegal logging trade at four times above the national quota and falling just short of ten times the registered annual haul (with exports to China and Vietnam reaching 1.4 million m<sup>3</sup> in 2013). Global Forest Watch estimated that 191,031 ha of forests were lost in 2014, up from 80,543 ha lost in 2008. This threat has been greatly curtailed by the introduction of PMO 15 to ban unprocessed timber exports, although illegal logging still occurs at lower intensities at all sites. This decline in logging is also correlated with a decline in the stocks of remaining valuable hardwoods.

**45. Lao PDR has a comparatively high international profile on illegal wildlife trade which is the main source of EIDs.** Human practices in the country are increasing exposure to wildlife, in two main ways: through legal and illegal trade, and through habitat degradation. In the last twenty years, China, Lao PDR, and other East Asian countries have experienced such epidemics as SARS, Highly Pathogenic Avian Influenza (HPAI, H5N1 and H7N9), re-emergence of Schistosomiasis, and the 2020 COVID-19 pandemic. There is a need to widen the spectrum of actions to protect human and economic health. Mitigation and management of human exposure to wildlife and wildlife products is essential to prevent the spill-over of EIDs.

**46. Lao PDR's neighbors, especially China and Vietnam, are important consumers or are significant destinations for illegal wildlife products, including ivory, rhino horns, and tiger and bear parts.** Lao PDR is a key transit country for trafficked wildlife and is one of Asia's main conduits for the illegal wildlife trade from Africa. It also has rich, unique biodiversity of its own, including high-value tree species, freshwater turtles, orchids, NTFPs, and medicinal plants, which are highly sought after by its neighboring countries. Large and medium-size mammal populations have been severely affected by the illegal wildlife trade, particularly from snaring. Both the tiger and the leopard have probably been extirpated from Lao PDR (Rasphone et al. 2019), predominantly through indiscriminate snaring. Elephant populations have also undergone major declines throughout the country due to habitat loss, poaching for the illegal trade, and human wildlife conflict, with viable populations perhaps only in the Nam Poui and Nam Ha NPAs. With lengthy international borders and numerous informal, traditional border crossings, strong political will, concerted interagency cooperation, and increased capacity and resources are required to effectively fight this transnational organized crime.

**47. The unsustainable utilization of NTFPs.** This issue is influenced by the growing rural population as well as commercial trading in high-value products. Over-hunting and over-harvesting contribute greatly to the loss of biodiversity, reducing the populations of numerous species over recent years. There is a long tradition of hunting in Lao PDR; rural communities are dependent on hunting and harvesting of wild products to supplement the seasonal rice harvests. Hunting for trade has a greater impact on wildlife than hunting for local subsistence and is often conducted by outsiders. Even where locals are the main hunters, they

are usually acting to supply externally initiated opportunities. In the rural areas, hunting is typically undertaken by men, while the collection of NTFPs is more often undertaken by women, depending on the NTFPs. Men are more involved in timber collection.

**48. Infrastructure development.** Hydropower projects and mining activities are being undertaken in a high percentage of protected areas with resulting impacts on biodiversity (habitat fragmentation, degradation, deforestation, increased access to resources, facilitation of illegal wildlife trade, and so on). Road construction within the NPAs has been largely muted within the legally designated protected areas in Lao PDR where forest conservation has been relatively robust (WBG 2018). However, road building has undergone a substantial increase in the last 20 years, some involving roads connecting settlements, others with less clear purpose or justification. Both road building and road upgrading in Lao PDR has an impact on biodiversity throughout a given landscape, by causing fragmentation.

**49. Good project-specific Environmental and Social Impact Assessments (ESIAs) and broader Strategic Environmental Assessments (SEAs) add value to investment decisions and can help reduce irreversible impacts on biodiversity values. SEA is another useful tool in the updated Lao policy framework in 2019 to address impacts and opportunities beyond single projects, such as helping balance biodiversity protection with hydropower development.**

**50. Agricultural expansion.** Forest clearance for smallholder farming is a challenge reflecting a lack of more sustainable options. Shifting cultivation is the dominant cropping system in the uplands and mountains of Lao PDR (Kenney-Lazar 2013), including inside the NPAs, usually at higher elevations. As many as 300,000 families are fully or partially engaged in shifting cultivation. Farm households with large livestock rely on natural pasture; the number of large livestock (buffaloes and cows) compared to the limited amount of natural or planted grasslands suggests that the majority of livestock nutrition comes from grassy vegetation in forestlands (Russell et al. 2015). Agricultural expansion is also linked to expanding settlements, particularly when they undergo rapid population growth.



*Indochinese Fulvetta – restricted in range to montane forests of the nation's highest mountains.  
Photo credit: John Parr.*

## 6. Priority actions

51. **The key threats to Lao biodiversity outlined above may be ameliorated by identifying priority interventions**, which may be categorized in terms of policy and legislation reform, strengthening of the institutions including concerned government agencies and villages to take the necessary remedial actions, and supporting information.
52. **Several priority actions are under way or could be considered to protect and sustainably utilize biodiversity assets to help drive Lao PDR's green economy.** The priorities presented in this section involve enhancements to incentives (policies, law, and markets), institutions, and information that together can help scale up investment to achieve impact. These actions are important for implementing the National Green Growth Strategy for 2030. These actions relate to several priority themes: (a) conservation areas and NBT; (b) village forest management, smallholder plantations, and commercial plantations; (c) illegal timber and wildlife trade oversight in relation to conservation forests and village forests; and (d) ESIA for projects and strategic environmental assessment (SEA) for sector and policy-level planning.
53. **Stronger policies and coordinated enforcement actions to stop illegal wildlife trade and better manage biodiversity and the legal animal trade** will help reduce the emergence and spread of zoonotic diseases such as COVID-19.



*The Xe Bang Fai cave is of outstanding universal value in Hin Nam No National Park, Khammouane. The site is presently being assessed for natural World Heritage Site designation.*

*Photo credit: Lao Tourism Development Department.*

## 6.1 Incentives: Priorities for policy, law, and markets

- 54. Policies and legislation should be introduced to mitigate the spread of zoonotic diseases, such as the 2020 COVID-19.** These policy and legislative measures might include (i) reduced anthropogenic activity; (ii) stronger illegal wildlife trade enforcement through better cooperation among concerned law enforcement agencies and tools to effectively curb illegal trade and regulate legal wildlife trade, (iii) legal wildlife trade re-examined, and (iv) creating or improving wildlife handling, transportation, and isolation facilities, wildlife breeding and rescue facilities, and (v) markets should be better regulated and controlled.
- 55. Conservation forests: The Prime Minister’s Decree on Protected Areas<sup>7</sup> could be revised to reflect the GOL’s strengthened commitment to the nascent national park agenda and the enhanced commitment to adopt the internationally recognized IUCN protected area categories.** Key aspects to consider include the formation of a Department of National Parks and Wildlife Conservation in the MAF and increased status of each national park management body within the provincial administrative system, including the issuance of a government stamp, the provision of adequate staffing levels, and interagency collaboration.
- 56. Conservation forests and private sector engagement in NBT: Establish regulations and procedures for tourism concessions in protected areas and other natural landscapes that provide clear steps and incentives for businesses to invest in NBT.** Policies and mechanisms need to be in place to ensure NBT models are environmentally, socially, and financially sustainable. These include protected area visitor fee systems, direct contributions of fees to protected area management, revenue sharing, and taxation of private sector concessionaires for ecosystem management on which their business models depend<sup>8</sup>. There is also a need for the education, skills training, and capacity building of tour operators and guides to ensure a high-quality visitor experience and to avoid or minimize tourism impact on ecosystems.
- 57. Village forest management.** A Regulation on Village Forest Management, plus supporting guidelines, could be formulated by the MAF to clarify the roles at the national, provincial, and district levels in supporting village forest management.
- 58. Private sector tree plantations.** The roles and responsibilities should be clarified for the concerned government agencies regarding the issuance of plantation concessions (and potentially dispute prevention and resolution) as well as a transparent and unified system across ministries for issuing land/forestry concessions, including for commercial plantations, that includes information about current uses and ownership/management arrangements. The role of private investments in socially and environmentally sustainable commercial plantations should reflect the ideas articulated in the 2019 Forestry Law.
- 59. Illegal timber and wildlife trade oversight in relation to conservation forests and village forests.** To help implement PMO 15 on controlling timber harvesting and PMO 5 on combating the illegal wildlife trade, the legislative framework for interagency law enforcement cooperation could be reviewed and revised. This interagency cooperation involves the Department of Combating Natural Resources and Environmental Crime (DCNEC), Department of Forest Inspection (DOFI), Lao

7 Prime Minister’s Decree on Protected Areas No. 134/Gov, dated May 13, 2015.

8 For more information, see a companion report published by the World Bank and MPI in 2019: Developing Nature-Based Tourism as a Strategic Sector for Green Growth in Lao PDR.



Customs Department (LCD), and other concerned agencies, to increase effective collaboration in suppressing forest and wildlife-related crime, including halting illegal wildlife trade linked to the spread of zoonotic diseases. Attention could be placed on getting illegal timber and wildlife trade issues onto the agenda of mainstream policing institutions.

- 60. ESIA of infrastructure projects in and around protected areas and other high biodiversity areas is required by the Lao policy framework, and there is a need to continue supporting MONRE's Department of Natural Resources and Environmental Policy, Ministry of Planning and Investment (MPI), and line ministries on ESIA implementation.** This is important to reduce the impact of large projects on biodiversity, ecosystem function, tourism development, and local poverty reduction. The Prime Minister's Decree 21 on Environmental Impact Assessment, dated January 31, 2019, provides updated detailed procedures prepared by MONRE for implementing ESIA, including public disclosure and participation, which are key tools for biodiversity protection.

## 6.2 Institutions: Priorities for strengthening the capabilities of government agencies and villagers to act

- 61. Continue to educate the concerned law enforcement agencies, and the general public, about the links between the illegal wildlife trade and zoonotic diseases such as COVID-19,** and the need to halt this activity with immediate effect throughout the country.
- 62. Conservation forests: Invest in capacity building in protected area management.** Government institutions responsible for protected area management would benefit from a larger cohort of trained professionals and recent graduates in collaborative protected area management, law enforcement, outreach, rural development, tourism, business management, and other related disciplines, as required. Staff in concerned agencies could undertake a long-term targeted training program on landscape governance to help build the institutional capacity to coordinate, plan, guide, regulate, and leverage economic activities across institutional, sectoral, and disciplinary boundaries to maintain and sustainably use biodiversity and ecosystem services for greener growth.
- 63. Village forest management: Invest in capacity building in village forest management.** Government institutions responsible for village forest management would benefit from training on village forest and land use planning, village land management plans, sustainable forest management, extension, and rural development and facilitation, as required. Villagers could also be trained in selected issues relating to village forest management.
- 64. Review and strengthen interagency law enforcement cooperation for mitigating illegal timber and wildlife-related trade.** This involves a review of the roles of the DCNEC, the LCD, and the DOFI and other concerned enforcement agencies regarding the effective functioning of the Lao-Wildlife Enforcement Network (Lao-WEN) and the National Task Force on Timber. It can be particularly useful to evaluate the functioning of the Provincial Wildlife Enforcement Networks to strengthen interagency law enforcement collaboration at the national level. These agencies can benefit from focused, sustained capacity building on sustainable forest management, CITES, and endangered species conservation. New technologies and approaches related to anti-money laundering and intelligence can be pursued.

## 6.3 Information: Priorities for outreach, extension, and education on biodiversity conservation

### Outreach and extension by concerned government agencies

65. **Invest in the environmental police, and other concerned law enforcement agencies, to halt illegal wildlife trade within the country,** including through proactive prosecutions.
66. **Conservation forests and village forests: Outreach should be promoted in buffer zone villages and forest communities on biodiversity conservation and natural solutions to climate change.** Tailor-made outreach programs on illegal wildlife trade and natural resource management should be promoted in the buffer zones of the national parks and other preserves. Climate-smart agricultural practices, such as intercropping and agroforestry, can be incorporated into extension packages. In urban centers, environmental education can be promoted with the emerging middle class. The use of communication tools can be leveraged, including local radio, social media, television, and messaging from village chiefs and other local institutions.
67. **Outreach should be undertaken by protected area staff to other law enforcement agencies involved with forest and wildlife-related crime.** Protected area staff should also conduct outreach programs on illegal wildlife trade and the law for hunters, villagers, restaurant owners, and market stall owners.

### Education

68. **Invest in educating the general public about the need to halt the consumption of wildlife in urban areas as well as the links between the illegal wildlife trade and the spread of zoonotic diseases within the country.** This education programme could be undertaken by a number of Ministries, with responsibilities for public health, biodiversity conservation and education.
69. **Mainstream biodiversity into education and learning which should be one of the country's priorities.** This should include introducing biodiversity and other environmental topics into curriculum development. It could also include experiential learning for elementary/secondary schools. The establishment of school nature clubs and youth conservation corps has been promising in diverse settings globally. Along with the challenge of climate change, the loss of biodiversity is one of humanity's main battlegrounds for sustainability. Education brings sustainability to development efforts, helps shape new ways of seeing the world, and new practices and behaviors, and makes biodiversity conservation possible. Education for sustainable development is needed to protect biodiversity and pursue options for economic activities that do not degrade biodiversity values.
70. **Promote research by relevant government research institutes, Lao universities, and concerned NGOs on different biodiversity aspects.** This could include scientific research on plants, insects, fish, reptiles, amphibians, birds, and mammals, including species that are rare and threatened. Biodiversity monitoring should also be undertaken to assess the status of conservation targets, to evaluate the effectiveness of management interventions and to inform and improve management practices through an adaptive management process. More knowledge is needed on species of socioeconomic value including fish biodiversity, NTFPs and medicinal plants, and high-value timber, among others.

71. Build on the “Environmental Education and Awareness Vision for 2030, National Strategy for 2018–2025, and Mission for 2018–2020” No. 6256/MONRE, dated December 4, 2018, to develop an environmental education strategy which identifies the different target audiences, their environmental educational needs, and the involvement of concerned ministries and agencies to implement tailor-made outreach and awareness programs. Tailor-made outreach programs should be promoted in village forest communities, the buffer zones of the national parks, on climate change, sustainable resource use, and illegal wildlife trade, and in farming communities on climate-smart agriculture. Family planning can be a useful tool to accompany development activities in rural areas. In urban centers, environmental education and nature education could be promoted with the emerging middle class, who have become segregated from biodiversity and natural ecosystems. The use of media tools should be encouraged through a holistic environmental education strategy involving all concerned agencies.



*Conservation education targeting rural schoolchildren in Nakai-Nam Theun National Park.  
Photo credit: Camille Coudrat/Association Anoulak.*

## 6.4 Investment priorities for biodiversity values

- 72. Building a strategic investment platform for landscapes would be valuable at national and subnational levels** to ensure that the full forest estate and competing land uses have a better chance of being carefully coordinated among various stakeholders, sectors, villages, forest categories, projects, and private investors. The National Green Growth Steering Committee, which is chaired by the Deputy Prime Minister, could provide strategic direction on investment planning and coordination at the level of large landscapes. This would help manage trade-offs from threats to biodiversity while also helping take advantage of mutual opportunities. One example is investing in upstream forest protection where downstream irrigation or hydropower investment is taking place so that erosion and flooding do not become a problem. To secure these types of benefits, provincial and district-level decision makers would convene to coordinate investment planning, project decisions, and synergies among activities on the ground.
- 73. The national park and protected area system could be strengthened by diversifying revenue into each reserve, such as the following:**
- (a) Regulations and procedures for tourism concessions in protected areas and other natural landscapes could be formulated by the MAF and MPI to provide clear steps and incentives for businesses to invest in NBT as well as an investment protection mechanism.
  - (b) The internationally significant conservation areas in the Annamites could be assessed for a serial natural World Heritage Site nomination, thereby raising the international profile of tourism sites in Lao PDR and boosting visits.
  - (c) Investments in villages located in the protected area buffer zones could be strengthened by MAF using poverty reduction funds, rural development NGOs, and co-funding measures.
- 74. Continue to promote best-practice commercial plantation investment in appropriate, degraded land in production forest areas** to reduce pressure on natural forest, protected areas, and wildlife. It is important that these commercial plantations are promoted and developed with full participation of the local villagers and strong support from concerned government agencies.
- 75. Pilot village forest management in target provinces and districts** outside of the NPAs to help operationalize good working relationships between provincial and district offices for agriculture and forests, and villages in terms of allocating management responsibilities, protecting the village forests, and enhancing sustainable village livelihoods and biodiversity assets.
- 76. Illegal timber and wildlife trade oversight** should be supported particularly as both the protected area system and village forest management are emerging programs of work, since the enactment of PMO 15, PMO 5, and the 2019 Forestry Law.

- 77. Infrastructure projects can have higher returns on investment by considering trade-offs and opportunities in the landscape.** Tourism infrastructure in protected areas should blend with the surroundings. Once the site plan is complete, next is the design of infrastructure such as trails, campgrounds, and eco-lodges. This is a job that should be entrusted to a licensed architect who understands the importance of harmonizing design with ecological processes and natural beauty. Local materials should be used where possible that reflect the natural aesthetic values and ingenuity of Lao culture. Sustainable building design must seek to use the building as an educational tool to demonstrate the importance of the environment in sustaining human life. It should reconnect people with their environment for the spatial, emotional, and therapeutic benefits that nature provides. It should also increase public awareness to use the appropriate technologies.
- 78. Road upgrading investments can benefit from explicit identification of ecologically vulnerable areas and transport investment impacts.** There are two main actions for Lao PDR planners to consider: First, given limited budgets, prioritize road upgrading locations toward corridors where expected biodiversity losses will be minimized. Second, adopt appropriate biodiversity protection measures in vulnerable road corridors and neighboring areas (WBG 2018).



*Infrastructure can be more sustainable and biodiversity-friendly through good environmental policy and planning such as ESIA.*

*Photo credit: Phoosab Thevongsa.*

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