

澜沧江流域生物多样性 格局与保护图集

Atlas of Biodiversity and Conservation
in the Lancang River Basin

中国科学院生态环境研究中心
世界自然基金会 编制



科学出版社

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序一

澜沧江-湄公河发源于中国的青藏高原，流经中国的青海省、西藏自治区、云南省和缅甸、老挝、泰国、柬埔寨，在越南形成湄公三角洲后注入南海。在它4 880千米的旅程中，这条东南亚最大的河流在汇集冰冷的激流、穿越险峻的峡谷后，平缓地流过洪泛平原和三角洲，由此也孕育繁衍了丰富而独特的生物多样性。

仅在2010年的一年时间里，大湄公河流域就发现了208种新的动物物种。这里还是1000多种鱼类繁衍生息的庇护所。这是世界自然基金会（WWF）将湄公河流域确定为全球生物多样性保护最重要区域之一的主要原因；它也是WWF在全球开展淡水保护项目的12条优先保护河流之一。

中国境内的湄公河上游又被称为“澜沧江”，全长2 161千米。它独特的地形地貌以及复杂多样的气候条件，孕育了丰富多样的生态系统，从高山草甸、温带森林到亚热带常绿阔叶林、热带季雨林和热带雨林。这里是中国三分之一以上高等植物和动物的家园，滇金丝猴、雪豹、亚洲象、黑颈鹤、藏羚羊及高山兀鹫等珍稀濒危物种都在这里繁衍生息。

这些生态系统共同形成了澜沧江流域最为重要的集水区，并为人类生存发展提供了丰富多样的生态服务。澜沧江流域生活着1 000多万人口，他们的生计和福祉都依赖于河流、森林、湿地等健康的自然系统。澜沧江为湄公河提供了13.5%的年径流量，在维护湄公河的生态健康中发挥着举足轻重的作用。

然而，它也面临着众多挑战，主要来自基础设施建设、矿业开采、农业、林业及气候变化。这些威胁有可能造成河流水质和水流的重大改变，进而对河流中的洄游鱼类以及陆生植物与动物生境带来负面影响。

WWF是唯一一个活跃在整个湄公河流域的非政府环保组织，从发源地中国一直到入海口越南都设有办公室。在中国，WWF着重关注通过推广流域综合管理及可持续水电标准，来确保河流在特定的时间有足够的流量和良好的水质。WWF同时也支持跨国界、多利益相关群体共同参加的交流合作平台，以促进更好的流域管理及保护。

对于这个复杂的河流系统，我们所知尚少。确定无疑的是，目前有关澜沧江的信息过于分散，无法提供整个流域的全貌。因此，系统地收集整理并分析目前关于这个区域的自然以及社会经济现状就变得异常重要。这样的努力将极大地推动该区域制定未来可持续发展与保护策略。

为此，WWF与合作伙伴一起编制出版了这本《澜沧江流域生物多样性格局与保护图集》。该《图集》不仅将增强我们对澜沧江流域生物多样性的了解，同时也能为相关部门制订湄公河及其流域内人民未来的决策提供重要依据。

地球上很少有像湄公河流域这样的地方，在如此邻近的范围内却拥有众多具有全球重要性的淡水与森林类型的栖息地。同时，也很少有像湄公河这样的地方，能够如此生动地展现了人与生态系统之间的根本联系。我希望该《图集》有助于促进我们协调一致的努力与合作，维护这一流域内广阔而独特的生态系统，并促进流域的可持续发展。

最后，衷心感谢参与和支持《图集》编制出版过程中的所有专家，特别是中国科学院生态环境研究中心的研究人员以及WWF的同事们。

世界自然基金会总部
全球淡水项目主任



李利锋

Foreword I

Originating from the Qinghai-Tibet Plateau in China, the life-giving Lancang-Mekong River runs through Qinghai Province, Tibetan Autonomous Region and Yunnan Province in China, down through Myanmar, Laos, Thailand and Cambodia, to form the Mekong delta in Vietnam as it flows into the South China Sea. During its journey of 4 880 km, the longest river in Southeast Asia changes from icy torrents through steep canyons in China to slow-moving rivers to placid delta, nurturing and sustaining an extraordinary level of biodiversity and endemism.

In 2010 alone, 208 new animal species were discovered in the greater Mekong River Basin. There are also more than 1 000 fish species living in the Mekong, which is why the basin is one of WWF's 35 global priority places, and the Mekong is one of 12 priority rivers where WWF focuses for freshwater conservation.

The Upper Mekong River in China is called the Lancang Jiang (“Jiang” means river in Chinese). It flows for 2 161 km in China and passes through a wide array of ecosystems from alpine meadows, temperate forests, to sub-tropical evergreen broadleaf forest, tropical monsoon forest and tropical rainforests. Its unique topography and the diverse yet complex climatic features have nurtured unique rivers and lakes, meadows and forests that are home for more than one-third of China’s higher plants and animals, including such rare and threatened species as the Yunnan snub-nosed monkey, the snow leopard, the Asia elephant, the black-necked crane, the Tibetan antelope, and the Himalayan griffon.

Together, these ecosystems form the most important collection areas in the Lancang river basin, and provide diverse ecosystem services for human development. More than 10 million people in the Lancang River Basin in China depend on healthy natural systems such as rivers, forests and wetlands for their livelihoods and well-being. By contributing about 13.5% of annual runoff of the Mekong, the Lancang plays a critical role in maintaining the ecological health of the whole river.

Yet, the river faces a myriad of challenges; these threats come from infrastructure development, mining, agriculture, forestry and climate change. Such threats have the potential to cause great changes in water quality and river flows, with negative effects on migratory fish species and habitat for plants and animals on land.

WWF is the only environmental NGO working across the entire Mekong river basin, from its headwaters in China to the Mekong delta in Vietnam. In China, WWF focuses on promoting integrated river basin management and sustainable hydropower standards to ensure adequate quantity, good quality and right timing of water flowing in the river. WWF also supports cross-boundary and multi-stakeholder communication and collaboration platforms that will result in better river basin management and conservation.

There is still much to be learned about the functioning of this complex river system. What we know for sure is that current information about the Lancang is too scattered to provide a good overview of the situation in the region. It is critical to collect, analyse and synthesise the existing data about the natural and socio-economic conditions of the region. These efforts will greatly help develop sustainable conservation and development strategies for the future.

With that in mind, we produced this *Atlas of Biodiversity and Conservation in the Lancang River Basin*. The atlas not only increases our understanding of biodiversity in the Lancang river basin, but also can serve as a tool for better informed decisions shaping the future of the Mekong and its people.

I would like to extend my thanks to all the experts involved in this project, especially the scientists from the Research Centre for Eco Environmental Sciences of Chinese Academy of Sciences and the staff of WWF in China and elsewhere.

Few places on Earth have as many globally important freshwater and forest habitats in such close proximity as the great Mekong. And few places on Earth demonstrate so dramatically the fundamental link between human and ecosystems as the great Mekong. I hope this resource will contribute to our concerted efforts to sustain the communities by sustaining the vast and unique ecosystems in the basin.

Director, Freshwater
WWF International



Lifeng LI

序 二

有“东方多瑙河”之称的澜沧江-湄公河，自北向南流经中国和东南亚五国，其复杂的地形地貌以及多变的气候造就了该流域丰富的生物群落和生态系统。在这里繁衍生息的珍稀动植物物种，是这片神奇地区真正的主人，它们与当地依水而生的人类共同拥有着这一宝贵的自然遗产。确保该流域生态系统的健康发展，不仅是在巩固其赖以生存的根基，更是在帮助其以可持续的方式走向未来。

然而，不计后果的开发利用对当地生态环境造成了破坏，原有的自然生态系统正在发生改变，生物多样性受到挑战。以上游的水电开发为例，它可能造成的水质改变及其对下游渔业和生态环境的影响，成为上下游居民担忧的问题。

其实，类似的问题在当今商业社会十分普遍。随着人口激增、城镇化和全球化步伐加快，人类对资源的需求和消耗迅速上升。过度开发有限资源，一味追求短期利益最大化，却忽略了资源的可持续性。在追求商业价值与保护生态环境之间，在谋求高速发展与守护自然家园之间，是否有一个平衡点？利益的两端或更远端，是否都可以被兼顾？政府、学界、商界和民众要如何协调一致、各担己任、改变现状、共筑长远？

令人欣慰的是，各界已经在行动，“可持续发展”是我们对社会和后代的共同承诺。正如WWF这样的国际环保公益组织，积极协同各部门、机构和企业，长期在云南致力于生物多样性和环境的保护工作。这本《澜沧江流域生物多样性格局与保护图集》的出版，就是美铝基金会携手WWF的EFN项目的延伸，旨在推动云南环境保护。它不仅是一本反映澜沧江流域生物多样性的珍贵文献，更是各方为当地制订可持续发展战略的重要参考。

作为一家成立了125年的跨国铝业公司，美铝深谙一个道理：企业若想谋求长期的发展，必须与环境和谐相处、与社区休戚与共，做负责任的资源使用者、产品生产者和社区合作者。从复垦铝土矿、采用环境友好型工艺、生产节能环保型产品到携手社区伙伴解决公共问题，美铝愿与各界合作，分享我们的经验，支持各方在可持续发展领域的努力。

最后，我谨代表美铝基金会，感谢WWF在过去几年中为推动云南生物多样性和环境保护所付出的努力！

美铝全球副总裁
兼美铝亚太区总裁



陈锦亚

Foreword II

The Lancang-Mekong River, also known as the Oriental Danube, flows from north to south through China, Myanmar, Laos, Thailand, Cambodia, and Vietnam. Its complex landforms and changeful climate have created rich and diverse biological communities and ecological systems in the river basin. The wild fauna and flora that inhabit in the area are the real owners of this incredible region, and they share this valuable natural heritage with the people who live by the river. To ensure the healthy development of the ecosystems in the river basin, it not only requires us to consolidate the foundation of the survival of all the beings, but also to help build a more sustainable future for all living in the region.

However, reckless development modes have brought upon damages to the local environment. The primitive natural systems are changing, and the biodiversity is under challenge. Take the hydropower development in the upper stream as an example. It could possibly change the water quality and affect the downstream fishery and environment, and these have become concerns of the people in both upper and lower stretches of the river.

As a matter of fact, such issues are common in current commercial world. With the drastic population increase and the acceleration of urbanization and globalization, human demand and consumption of resources are also rapidly escalating. The sustainability of resources is neglected during the process of over-exploiting resources and the blind pursuit of maximizing short-term benefits. Is there equilibrium between the search for commercial value and environmental protection, between the pursuit of high-speed development and nature conservation? Could both ends, or even further ends, of interests be attended to simultaneously and reconciled? How could governments, academics, businesses, and the civil society coordinate and synchronize, bearing their own responsibilities, in order to change the status and build a sustainable future?

What is gratifying is that all the different sectors are taking actions now. Sustainable development is our common commitment to the world and the future generations. WWF as an international conservation organization, for example, has long been engaged in the environmental protection and the biodiversity conservation in Yunnan Province, coordinating and facilitating with different government agencies, institutions and businesses. The publication of this *Atlas of Biodiversity and Conservation in the Lancang River Basin* is an extension of the joint Education for Nature (EFN) Programme between WWF and Alcoa Foundation with the aim to promote environmental protection in Yunnan. It is not only an important literature that helps readers understand the biodiversity in Lancang River Basin, but also serves as a valuable reference for different sectors when they are making local sustainable development strategies.

As a multinational aluminum company that has been established for 125 years, Alcoa deeply believes that for its long-term development, an enterprise must care for the environment and the communities, and act as a responsible resource user, product manufacturer, and community partner. From reclamation of bauxite mines to adoption of environmentally-friendly technologies and processes, manufacturing of energy-saving and environmentally-friendly products, and to working with community partners to solve public problems, Alcoa is ready to work with different sectors, share our experiences, and support efforts of various parties in sustainable development.

At the end, please allow me to thank WWF on behalf of Alcoa Foundation for its efforts in promoting biodiversity conservation and environmental protection in Yunnan Province in the past years.

Vice President of Alcoa &
President of Alcoa Asia Pacific



Jinya CHEN

前 言

澜沧江是湄公河上游在中国境内河段的名称，是一条国际河流，全称湄公河—澜沧江(Lancang-Mekong River)，位于东经 $94^{\circ}\sim 107^{\circ}$ 、北纬 $10^{\circ}\sim 34^{\circ}$ 之间，是世界第九长河、亚洲第四长河、东南亚第一长河。

该河流发源于我国青海省玉树藏族自治州的杂多县唐古拉山北麓，流至西藏昌都后始称澜沧江，南流至云南省南腊河口出境。出境后改称湄公河，在越南胡志明市以南注入太平洋，流经中国、缅甸、老挝、泰国、柬埔寨、越南六国。干流全长4 880.3千米，流域面积74万平方千米，是亚洲唯一的一条横跨六国的国际河流，有“东方多瑙河”之称。

澜沧江在我国干流长2 161千米，流经青海、西藏、云南三省区，其中，由河源至南阿河口2 130千米为中国内河，南阿河口至南腊河口31千米为中缅界河。在2 130千米内河中，青海境内长454千米，西藏境内长480千米，云南境内长1 227千米。流域面积为16.74万平方千米，出境处多年平均流量约为2 350立方米/秒，天然落差约4 583米。澜沧江北部隔唐古拉山与长江上游通天河毗邻，东部以宁静山、云岭山脉和无量山脉作为与金沙江、红河的分水岭，西部隔唐古拉山及延伸的怒山山脉与怒江大致并行南下。

澜沧江流域由北向南纵跨纬度 13° ，地势高，山峦重叠；起伏大，流域内气候差异很大，气温及降水量一般由北向南递增，海拔越低，气温越高，降水量越多。流域属西南季风气候，干、湿季节分明，水平变化和垂直变化特点明显。垂直变化在高山峡谷区最为显著，还常出现“山上降雨河谷晴、河谷降雨山上雪”的立体气候特征。

澜沧江流域发育了热带雨林、季雨林、亚热带季风常绿阔叶林、暖热性针叶林、半湿润常绿阔叶林、中山湿性常绿阔叶林、苔藓常绿阔叶林、寒温带针叶林、高寒草甸、湖泊等多种多样的生态系统，为各类动植物物种生存繁衍提供了丰富多样的生境。据研究资料统计，在澜沧江流域共有从热带到高寒地带的维管束植物11 000多种，植物区系复杂，各区植物交错集结，是特有植物分布与分化的中心。流域有野生脊椎动物1 100多种，汇聚了我国青藏高原、西南两大动物区系的许多种类，聚集了大量的珍稀濒危野生动物物种，是世界生物资源宝库。澜沧流域珍稀、特有、孑遗生物种类繁多，有国家一级保护动物雪豹、藏羚羊、藏野驴、滇金丝猴、亚洲象、绿孔雀、黑颈鹤、黑颈长尾雉、麝鹿、印支虎、长臂猿、蜂猴、灰叶猴、印度野牛等；以及穿山甲、岩羊、犀鸟、大理裂腹鱼、巨鲶、巨蜥、版纳螆等国家重点保护和特有物种；植物有长苞冷杉、云南红豆杉、光叶珙桐、云南蓝果树、望天树、野生稻等。澜沧江流域在全国乃至国际上生物多样性保护中都占有极为重要的地位。

澜沧江流域内水电、矿藏及旅游资源十分丰富，极具开发价值，也面临极大的开发压力。澜沧江水能资源理论蕴藏量3 656万千瓦，可开发水电的总装机容量为2 825.4万千瓦。流域矿产资源丰富，分布范围较广，有色金属矿产资源最为丰富。

澜沧江流域涉及青海、西藏和云南三省区，为多民族集聚地区，仅云南段流域内就分布有藏族、傣族、白族、布朗族、彝族等17个世居少数民族。各民族的习俗风情、生活方式和宗教信仰各具特色，形成了独特的自然资源利用方式。

澜沧江流域地质环境脆弱，稳定性差，水土流失严重，山地自然灾害频繁，植被退化严重。同时，由于南北走向和巨大的垂直高差，澜沧江流域也是全球气候变化的敏感区域，对指示未来气候变化趋势可起到“晴雨表”的作用。

本图集旨在系统地介绍澜沧江流域生物多样性特征、重要保护物种和生态系统、生物多样性威胁因素，以及流域生物多样性保护的关键区域与保护目标，为推进澜沧江流域生物多样性保护工作提供参考。

本图集得到美铝基金会、世界自然基金会(WWF)和国家科技支撑计划课题“西南生态安全屏障决策支撑技术体系”的支持。

Preface

The Lancang River is what the Mekong River is called in China, and its full name is Lancang-Mekong River as an international river. Located between $94^{\circ}\sim 107^{\circ}\text{E}$, and $10^{\circ}\sim 34^{\circ}\text{N}$, the Lancang-Mekong River is the ninth longest river in the world, the fourth longest in Asia, and the longest in Southeast Asia.

The Lancang-Mekong River originates from the north piedmont of Tanggula Mountains in Zaduo County, Yushu Tibetan Autonomous Prefecture of Qinghai Province, China. It is called the Lancang River when it flows to Changdu County of Tibet Autonomous Region, and Mekong River after it flows out of China at Nanla river mouth in Yunnan. After flowing through China, Myanmar, Laos, Thailand, and Cambodia, the Lancang-Mekong River flows into the Pacific Ocean at the south of Ho-Chi-Minh City of Vietnam. The main stem of the Lancang-Mekong River is 4 880.3 km long, and the river basin's area is 740 000 km², making it the only international river in Asia that stretches over 6 countries and own the honor of "the Oriental Danube".

The main stream of Lancang River flows 2 161 km through Qinghai Province, Tibet Autonomous Region and Yunnan Province in China, out of which the 2 130 km is the Chinese inland river from the source to Nan'a river mouth, and the remaining 30 km from Nan'a river mouth to Nanla river mouth is the border river between China and Myanmar. Among the 2 130 km Chinese inland river, 454 km is within Qinghai Province, 480 km within Tibet Autonomous Region, and 1 227 km within Yunnan Province. The area of the Lancang River Basin is 167 400 km². Its multi-year average annual runoff at the border of China is 2 350 m³/s, and the natural head is 4 583 m. To the north, the Lancang River neighbours with Tongtian River which is the upstream of Yangtze River. To the east, it is divided from Jinsha River by Ningjing and Yunling Mountains, and from Red River by Wuliang Mountains. To the west, it parallels Nu/Upper Salween River flowing south along Nu Mountains.

The Lancang River Basin stretches across, from north to south, 13 degrees in latitude. With the mountains and the high elevation, the climate differs significantly in the Lancang River Basin. The temperature and the precipitation increase progressively from north to the south—the lower the elevation, the higher the temperature and the more precipitation. The river basin is under the influence of the southwest monsoon climate, with distinct dry and wet seasons, and evident horizontal and vertical changes in climate patterns. The vertical changes are the most visible in regions with high mountains and gorges; the stereoscopic weather often demonstrates when it rains in the mountain while sun shines in the river valley and when it rains in the river valley it snows in the mountain.

The Lancang River Basin has various ecosystems, such as tropical rainforest, monsoon forest, subtropical monsoon evergreen broad-leaf forest, temperate coniferous forest, semi-humid evergreen broad-leaf forest, mid-mountain humid evergreen broad-leaf forest, and mossy evergreen broad-leaf forest, providing habitats to a variety of fauna and flora species. According to research statistics, there are more than 11 000 kinds of vascular plants ranging from tropical to alpine and cold regions in the Lancang River Basin. With complicated flora composition, it is the centre of endemic plant species distribution and differentiation. More than 1 100 species of wild vertebrates live in the Lancang River Basin. Many endangered, endemic, and living fossil species can be found in the Lancang River Basin: species under the first class protection including *Uncia uncia*, *Pantholops hodgsoni*, *Equus kiang*, *Rhinopithecus bieti*, *Elephas maximus*, *Pav muticus*, *Grus nigricollis*, *Syrmaticus humiae*, *Tragulus javanicus*, *Panthera tigris corbetti*, *Hylobatidae*, *Nycticebus bengalensis*, *Trachypithecus phayrei*, *Bos gaurus*; species under key protection and endemic including *Pholidota*, *Pseudois nayaur*, *Bucerotidae*, *Schizothorax taliensis*, *Bagarius yarrelli*, *Varanus salvator*, *Ichthyophis bannanicus*, *Abies georgei*, *Taxus yunnanensis*, *Davidia involucrata* var. *vilmoriniana*, *Nyssa yunnanensis*, *Parashorea chinensis*, and *Oryza*. The Lancang River Basin is a world class treasure of biological resources and of great significance in both domestic and global biodiversity conservation.

The Lancang River Basin is also rich in hydroelectric, mineral and tourism resources, which are of development value, but also face great development pressure. The theoretical reserve of hydropower resources of Lancang River is 36.56 million kilowatts, and the installed capacity is 28.25 million kilowatts. The nonferrous metal mineral resources are the most abundant.

The Lancang River flows through Qinghai Province, Tibet Autonomous Region and Yunnan Province, and the region is inhabited by a variety of ethnic groups. 17 minority ethnic groups including the Tibetans, the Dais, the Bais, the Bulangs, and the Yis, have been living generations after generations in the river basin in Yunnan alone. Each ethnic group has its own culture, lifestyle and religious beliefs, and as a result a unique way of using the natural resources.

The geological environment of the Lancang River Basin is fragile with poor stability and serious soil erosion. Natural disasters happen frequently and vegetation's degeneration is severe. On the other hand, as the river flows north-south and the vertical elevations in the basin differ considerably, the Lancang River Basin is sensitive to global climate change. It can function as a barometer for future trend of climate change.

This atlas aims to introduce in a systematic way the biodiversity features and threat factors, the species and the ecosystems under key protection, the priority conservation areas, and the conservation goals of the Lancang River Basin. We hope that it will provide a reference in enhancing the biodiversity conservation in the Lancang River Basin.

The atlas is supported by the ALCOA Foundation, WWF, and the "Decision support technology system for southwest ecological security barrier" Project under the State Science and Technology Support Program.

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