



# 小黑山 自然保护区


*Xiaokeishan Nature Reserve*

云南省林业厅  
中荷合作云南省 FCCDP 办公室 编  
云南省林业调查规划院

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## 序

云南生物资源极为丰富,其动物和植物种类均占中国总数的一半以上,素有“植物王国”、“动物王国”等美誉。为了保护这些丰富的生物资源及其栖息环境,目前,云南省已建立了各类自然保护区 181 个,其中国家级 13 个,省级 45 个,州(市)级 70 个,县级 53 个,总面积达 326.8 万  $\text{hm}^2$ ,占云南土地总面积的 8.3%。这些自然保护区大多数位于经济落后的边远山区,周边社区群众的生产生活对自然保护区自然资源的依赖相当严重,这无疑给自然保护区的管理和建设带来一定困难。为了搞好自然保护区的管理和建设,探寻出有效的途径和方法,在《思茅林业行动计划》(SFAP)的基础上,中国和荷兰两国政府确定了为期五年的,涉及莱阳河(省级)、糯扎渡(省级)、无量山(国家级)、高黎贡山(国家级)、小黑山(省级)和铜壁关(省级)6 个自然保护区的“中荷合作云南省森林保护与社区发展项目(FCCDP)”,并于 1998 年 1 月 15 日签署 FCCDP 实施协议,同年 4 月正式启动。其长远目标是:保护云南省,特别是思茅、保山、怒江和德宏地区的热带、亚热带森林和生物多样性资源。内容包括:加强云南省林业厅及项目地区森林保护部门和自然保护区的机构能力建设、应用参与式方法组织开展社区发展活动、开展森林保护与自然保护区管理活动。具体体现在:在职人员培训;配备各类设备和基础设施建设;开展公众环境保护意识教育活动;编制并实施《自然保护区综合管理计划》;实施《社区环境行动计划》;编制并实施《周边地区管理计划》;开展参与式自然保护和资源的监测活动;建立专业化的 GIS(地理信息系统)中心;开发“自然保护区信息管理系统(NRIMS)”；开展自然保护区和周边地区的森林资源及生物多样性调查、监测和分析(IMA)工作;开展思茅地区森林防火和松毛虫防治活动;……等。

通过几年的工作,收集了有关自然保护区管理和建设的大量数据、信息、资料等,并取得了一些宝贵的经验和成果。为了将 FCCDP 的工作思路、方法、经验和成果推荐给其他自然保护区,以便进行交流、共勉,有必要把 FCCDP 获得的自然保护区 GIS 和 IMA 工作成果,以及自然保护区管理工作和社区发展成果,编成资料性专著出版。这些专著有《莱阳河自然保护区》、《糯扎渡自然保护区》、《无量山国家级自然保护区》、《小黑山自然保护区》、《莱阳河自然保护区生物多样性监测》、《无量山自然保护区生物多样性监测》等。

专著充分反映了 FCCDP 在自然保护区和周边地区的工作成果,涉及自然地理环境、植被与植物、森林、大型真菌、野生动物、土地利用、社会经济和社区发展、保护区建设与管理、生物多样性监测等,手段较为先进,内容丰富,资料翔实,对广大的自然保护区管理工作、自然科学工作者、林业工作者、高等院校的学生等具有一定的参考价值,也期望能对自然保护区森林资源及生物多样性调查、监测和分析工作,对自然保护区的管理和建设,起到良好的推动和示范作用。

FCCDP 荷方主任:BRAM BUSSTRA

FCCDP 中方主任:王为民

## Introduction

Yunnan province has rich biological resources, possessing more than half of the total number of plants and animals occurring in the whole of China. It has therefore always enjoyed the reputation of being a "Kingdom of Plants" and a "Kingdom of Animals". In order to protect the abundant biological resources and their habitats in Yunnan, 181 nature reserves have been established in the province, including 13 national nature reserves, 45 provincial nature reserves and more than 123 prefecture and county level nature reserves. The total area is 32 680 km<sup>2</sup>, which accounts for 8.3 % of the land area of Yunnan province. Most nature reserves in Yunnan are located in remote areas where the poor residents have a heavy dependency on the resources in the reserves, which undoubtedly adds considerable difficulties to reserve management. To introduce new approaches to nature conservation in China in general and improve nature reserve management in Yunnan in particular, the Government of The People's Republic of China and the Government of the Netherlands entered an agreement on January 15, 1998 on the basis of "Simao Forestry Action Plan" (SFAP) to jointly implement the "Sino - Dutch Cooperation Forest Conservation & Community Development Project" (FCCDP). FCCDP formally started in April 1998 and covers six nature reserves of Yunnan, namely, Caiyanghe Provincial Nature Reserve, Nuozhadu Provincial Nature Reserve, Wuliangshan National Nature Reserve, Gaoligongshan National Nature Reserve, Xiaoheishan Provincial Nature Reserve and Tonghiguan Provincial Nature Reserve. The long-term objective of the FCCDP is to conserve the tropical and subtropical forests and biodiversity resources of Yunnan, especially of Simao, Baoshan, Nujiang and Dehong Prefectures. Actions of the project include strengthening the institutional capacity of the Yunnan Department of Forestry and the related forest conservation and nature reserve management departments in the project area, implementing community development activities by adopting participatory approaches, and developing forest conservation and reserve management activities. Specific activities include staff training, purchasing equipment, building infrastructure, developing awareness - building activities, implementing participatory resource - monitoring activities, establishing a geographical information system (GIS) center, developing a nature reserve information management system, developing forest resource and biodiversity inventory, monitoring and analysis (IMA) activities, forest fire -, pest - and disease - control in Simao Prefecture, and others.

Over the past years, the project has collected a large volume of data, information, and materials and accumulated quite valuable experiences in nature reserve management. To summarize and extend the experiences and achievements of the project, it is necessary to publish the findings and results of the project components, i. e. IMA, GIS, reserve management and community development. These results are reflected in monographs such as "*Caiyanghe Nature Reserve*", "*Nuozhadu Nature Reserve*", "*Wuliangshan Nature Reserve*", "*Xiaoheishan Nature Reserve*", "*Biodiversity Monitoring of Caiyanghe Nature Reserve*" and "*Biodiversity Monitoring of Wuliangshan Nature Reserve*".

These works, covering physiographic features, vegetation, plants, forests, macro - fungi, wildlife,

land uses, socio - economics and community development, nature reserve construction and management, biodiversity monitoring and many other aspects, reflect the accomplishments of FCCDP implementation in the reserves and their adjacent area. With rich contents and accurate data, these monographs will become a valuable reference for reserve managing staff, scientists and researchers, foresters and students at colleges and universities. It is also expected that these monographs can help promote the inventory, monitoring and analysis of forest resources and biodiversity of nature reserves and benefit the management and construction of nature reserves.

Dutch Director of FCCDP: BRAM BUSSTRA

Chinese Director of FCCDP: WANG WEI - MIN



## 前 言

小黑山自然保护区位于云南省保山市龙陵县境内,怒江流经江中山子保护区的东侧,属于生态系统类别森林生态系统类型的自然保护区。位于东经  $90^{\circ}34' \sim 99^{\circ}11'$ ,北纬  $24^{\circ}15' \sim 24^{\circ}51'$  之间,总面积  $16\,012.8\text{ km}^2$ ,其中省级保护区面积  $6\,293.4\text{ km}^2$ ,占  $39.3\%$ ;县级保护区面积  $9\,719.4\text{ km}^2$ ,占  $60.7\%$ 。省级保护区中核心区面积  $3\,653.7\text{ km}^2$ ,占  $58.1\%$ ;实验区面积为  $2\,639.7\text{ km}^2$ ,占  $41.9\%$ 。县级保护区中核心区面积  $2\,195.5\text{ km}^2$ ,占  $22.6\%$ ;实验区面积为  $7\,523.9\text{ km}^2$ ,占  $77.4\%$ 。保护区内最高海拔  $3\,001.6\text{ m}$ (大雪山山顶),最低海拔  $600\text{ m}$ (怒江江边),垂直高差  $2\,401.6\text{ m}$ 。

1995年,经云南省人民政府批准,正式建立小黑山自然保护区,同时成立了小黑山自然保护区管理所,级别为省级。1996年,经龙陵县人民政府批准,扩大  $9\,719.4\text{ km}^2$  为县级保护区。到1998年,建立了古城山、一碗水、小黑山、大雪山和江中山五个管理站,负责古城山、一碗水、小黑山大雪山和江中山四个子保护区的管理工作。

小黑山自然保护区建设和管理是“中荷合作云南省森林保护与社区发展项目(FCCDP)”的一个子项目,也是FCCDP地理信息系统(GIS)和森林资源及生物多样性调查、监测和分析系统(IMA)工作的保护区。

2000年3月1日,FCCDP设在云南省林业调查规划院的“中荷合作FCCDP-GIS中心”正式成立,它是FCCDP的数据中心、信息中心和信息技术中心,其目的是为FCCDP提供GIS技术支持和服务。在FCCDP中,GIS是指广义的地理信息系统,即大GIS,它是地理信息系统(GIS)技术、遥感(RS)技术、全球定位系统(GPS)技术、数据库(DB)技术、网络(NW)技术、虚拟现实(VR)技术等现代信息技术的统称。

IMA分I、II、III、IV、V五个亚系统,其中:IMA-I是生物多样性调查,分植被、植物、鸟类、兽类、两栖爬行类、昆虫和大型真菌七个专题;IMA-II为实验区受威胁生态系统和生物多样性监测;IMA-III为核心区关键物种和生态系统监测;IMA-IV为森林生产能力和利用强度监测;IMA-V为土地利用监测。云南省林业调查规划院主要承担GIS和IMA-I、IV、V工作。GIS和IMA都是FCCDP的重要组成部分。IMA为GIS提供调查和监测数据,GIS为IMA提供技术支持,用先进的GIS技术支持IMA工作的开展,为提高IMA工作精度和效率服务。两者相辅相成,密不可分。

小黑山自然保护区IMA-I、IV、V野外调查工作,于2002年4月开始,2004年5月结束。调查工作采用的方法是用先进的GIS技术与常规的IMA调查方法相结合,进行森林资源、生物多样性和土地利用调查。这是FCCDP区别于常规操作方法的主要特点之一。在野外工作开展前,IMA专家和GIS技术人员一起,共同协商GIS技术与常规调查方法的结合点,制定GIS技术应用于IMA调查的数据标准,统一规范,按标准和规范开展野外调查和内业数据处理。在小黑山自然保护区IMA工作中做到了用GPS技术、RS技术和常规调查方法采集数据,用GIS技术处理数据,用数据库技术管理和存储数据,用网络技术交流和共享数据,克服了以往GIS技术应用单一,GIS技术与常规调查方法结合不紧密的现象,实现了GIS技术与常规调查方法的紧密结合,野外调查数据定位准确,精度较高,制作了精美的各类三维立体专题图,增强了调查成

果的科学性和实用性。

通过 IMA-I、IV、V 调查,基本摸清了小黑山自然保护区及周边地区的森林资源、生物多样性和土地利用本底状况,获得了有科学价值的第一手资料,取得了丰硕成果。

小黑山自然保护区及周边地区的 IMA 调查工作,涉及学科多,技术手段先进,获取的成果资料极为丰富,这些成果是本书编写的主要资料。此外,在本书中还收录了自 1998 年 FCCDP 工作开展以来,在小黑山自然保护区及周边地区实施的快速农村评估(RRA)、快速林业评估(REA)、公众意识教育(AB)、社区环境行动计划(CEAP)、初步综合管理计划(PIMAP)、周边地区管理计划(AMP)、江中山野生稻生境调查、江中山绿孔雀生境调查、生物走廊带建设规划、旅游规划、参与式资源监测等部分资料,以及保护区建立前后在小黑山地区开展的其他工作所获得的一些成果资料。在上述工作成果的基础上,按自然保护区综合科学考察的要求,增补了自然地理环境内容。最终定稿的《小黑山自然保护区》专著,由第一章自然地理环境、第二章植物、第三章植被、第四章森林、第五章大型真菌、第六章兽类、第七章鸟类、第八章两栖爬行类、第九章昆虫、第十章土地利用、第十一章社会经济与社区发展、第十二章保护区建设与管理以及专题图和图片组成。

在小黑山自然保护区及周边地区的 IMA 调查工作中,在专著的编写过程中,得到了云南省林业厅、中荷合作云南省 FCCDP 办公室、云南师范大学、西南林学院、南开大学、中国科学院昆明动物研究所、中国科学院昆明植物研究所、龙陵县林业局、小黑山自然保护区管理所等单位的大力支持和配合,得到了省 FCCDP 办公室领导和官员、国际国内 GIS 和 IMA 专家、保护区管理部门领导和工作人员的支持和帮助,陕西师范大学郑哲民教授,南开大学任树芝教授,中国科学院昆明动物研究所熊江研究员,西南林学院徐正会教授、尹五元教授,云南大学陆树刚教授,西南大学石福民教授,苏州大学蔡平教授等专家帮助鉴定了部分标本,西南林学院的和秋菊等同志参加标本整理和制作。在此谨表示衷心的感谢。

编 者

## Preface

Xiaoheishan Nature Reserve is in Longling County, Baoshan City, Yunnan Province. It ranges from  $90^{\circ}34'$  to  $99^{\circ}11'E$  and from  $24^{\circ}15'$  to  $24^{\circ}51'N$ , with the Nujiang River running through it. It is a forest ecosystem type reserve, totaling  $160\text{ km}^2$  in area. The nature reserve is made up of two parts governed by different regulations and policies: one part ( $63\text{ km}^2$  or 39% of the total) is managed as a provincial nature reserve and the other ( $97\text{ km}^2$  or 61% of the total) as a county-level reserve. In both parts, a core zone (respectively  $37\text{ km}^2$  and  $22\text{ km}^2$  in the provincial and county-level parts) and an experimental zone (respectively  $26\text{ km}^2$  and  $75\text{ km}^2$ ) are distinguished. Elevation of the reserve ranges from 600m (by Nujiang River) to 3 001.6m (the summit of Daxueshan).

Xiaoheishan Nature Reserve was formally established as a provincial reserve in 1995 upon the approval of the Provincial Government of Yunnan. The management office was subsequently set up. In 1996, the Government of Longling County decided to add another  $97\text{ km}^2$  to the nature reserve but the added part was to be managed as a county-level nature reserve. By 1998 five management stations had been set up at Guchengshan, Yiwanshui, Xiaoheishan, Daxueshan and Jiangzhongshan.

Xiaoheishan Nature Reserve is one of the six nature reserves in Yunnan Province assisted by the Sino-Dutch Forest Conservation and Community Development Project (FCCDP). It was an area implementing the forest resource and biodiversity Inventory, Monitoring and Analysis system (IMA) component of the project.

On March 1, 2000, a GIS (Geographic Information System) Center was formally established at Yunnan Institute for Forestry Inventory and Planning (YIFIP) with the assistance of FCCDP, acting as a center of data, information and information technologies supporting project implementation. In FCCDP, GIS is used in its broad sense to refer to all the subjects and technologies related to the applications of GIS, remote sensing (RS), databases (DB), networking (NT) as well as virtual reality (VR).

IMA is composed of five subsystems, aiming respectively at: (I) an inventory of biodiversity (vegetation, plants, birds, mammals, amphibians and reptiles, insects and macro-fungi); (II) monitoring of threatened ecosystems and biodiversity in the experimental zone; (III) monitoring of key species and ecosystems in the core zone; (IV) monitoring of production and use of forest resources; and (V) monitoring of land uses. YIFIP is mainly responsible for IMA I, IV and V. GIS and IMA are both important components of FCCDP. IMA provides data and monitoring for the GIS database, while the use of RS and Global Positioning System (GPS) supports IMA by enabling higher accuracy and efficiency.

The fieldwork for IMA I, IV and V in Xiaoheishan Nature Reserve lasted from April 2002 to May 2004. Forest resources, biodiversity and land uses were surveyed using a combination of GIS technology and more conventional inventory methods. This is what makes the difference between FCCDP implementation and other similar activities. Before the start of the fieldwork, IMA experts discussed with GIS technicians to decide ways to integrate GIS, RS and GPS techniques and traditional inventory

methods, and formulated data types and format. The accuracy and precision of conventional inventory methods were improved by using GPS and RS techniques for data collection, GIS for data processing, DB techniques for data storage and NT techniques for data sharing and exchange. This has successfully enhanced the linkages between GIS technologies and more conventional methods and increased the accuracy of the results. A series of thematic maps were prepared on the basis of the collected data, making the results of the inventory more scientific and more accessible to users than those obtained completely through traditional methods.

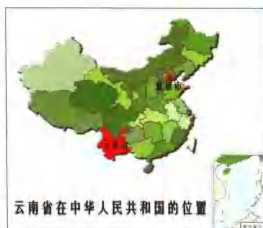
With large volumes of first-hand data gathered, the implementation of IMA I, IV and V led to a better understanding of the biodiversity, forest resources and land uses of Xiaoheshan Nature Reserve and its adjacent area and provided rich information on the reserve.

The IMA data collected in Xiaoheshan Nature Reserve and its adjacent area involved different disciplines as well as the application of a series of different techniques. These data form the basis of this book. Besides these, data collected since 1998 in implementing rapid rural appraisal (RRA), rapid forest appraisal (RFA), awareness building (AB), community environmental action plans (CEAPs), preliminary integrated management plans (PIMAP), adjacent area management plans (AMP), thematic surveys (e.g. on the habitats of wild rice and green peacocks at Jiangzhongshan), tourism planning, biological corridor creation planning, participatory resource monitoring and etc. are reflected in this book. In accordance with the requirements for comprehensive survey of nature reserves, details of local geographical conditions are added. The first chapter of this book describes the physical and geographical context of the reserve; chapters 2, 3 and 4 deal respectively with the plants, vegetation and forests; data on the macro-fungi are presented in chapter 5, while chapters 6, 7, 8 and 9 present information on the mammals, birds, herpetofauna and insects. The last three chapters present information on land use, on socio-economic conditions and community development in the adjacent area, and on reserve management. This book also contains many thematic maps and photographs.

The authors of this book are indebted to Yunnan Department of Forestry, PMO of FCCDP, Yunnan Normal University, Southwest Forestry College, Nankai University, Kunming Institute of Zoology, Kunming Institute of Botany, the Forestry Bureau of Longling County and the Management Office of Xiaoheshan Nature Reserve for their support and cooperation during the fieldwork and the writing of this book. Thanks are also extended to the leaders and experts from FCCDP, the GIS and IMA experts from home and abroad and the leaders and general staff of Xiaoheshan Nature Reserve who gave substantial assistance during the whole process. Prof. Zheng Zhemin from Shanxi Normal University, Prof. Ren Shuzhi from Nankai University, Prof. Xiong Jiang from Kunming Institute of Zoology, Prof. Xu Zhenghui and Prof. Yin Wuyuan from Southwest Forestry College, Prof. Lu Shugang from Yunnan University, Prof. Shi Fumin from Southwest University, Prof. Cai Ping from Suzhou University have assisted in the identification of specimens. Ms. He Qiuju from Southwest Forestry College participated in the preparation of specimens.

The Authors

# 小黑山自然保护区位置图



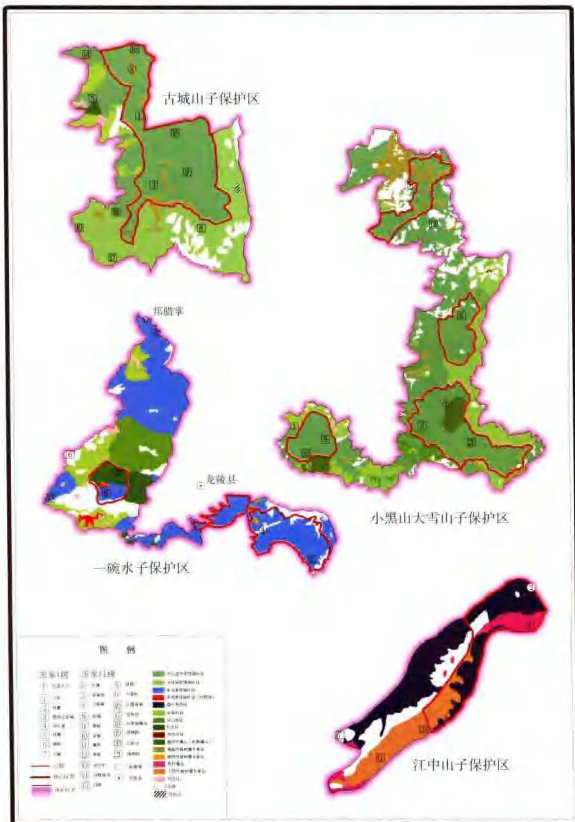
## 图例

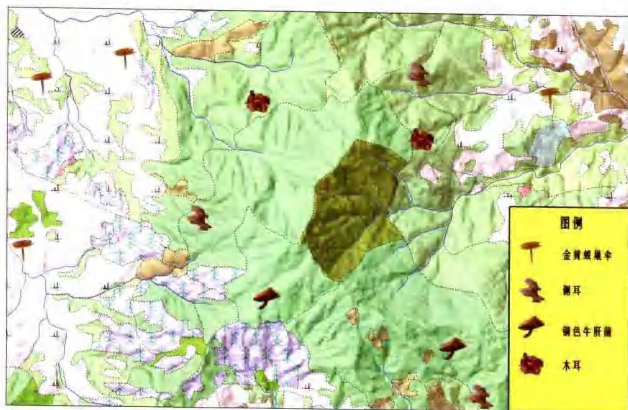
- |       |       |          |       |
|-------|-------|----------|-------|
| ★ 首都  | ○ 乡政府 | —— 国界    | —— 乡界 |
| ● 省政府 | ● 管理所 | —— 州(市)界 | ■ 保护区 |
| ● 县政府 | ● 管理站 | —— 县界    |       |

The map illustrates the spatial distribution of four mountain reserves within the Three Gorges Reservoir Area. The reserves are color-coded: 古城山子保护区 (yellow), 小巫山大雷山子保护区 (red), 一碗水子保护区 (green), and 江中山子保护区 (blue). The map also shows the county boundaries, the provincial boundary, and the reservoir boundary. A legend in the bottom right corner defines the symbols for county government, management bureau, management station, county boundary, provincial boundary, reserve boundary, and surrounding area. A north arrow is located in the top right corner. An inset map in the bottom left corner shows the location of the reserves within the larger region of the Three Gorges Reservoir Area.



# 小黑山自然保护区植被和国家重点保护野生动植物分布示意图



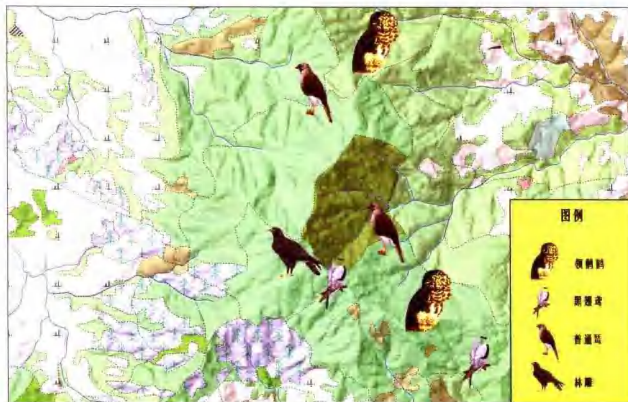


大型真菌分布图(局部)

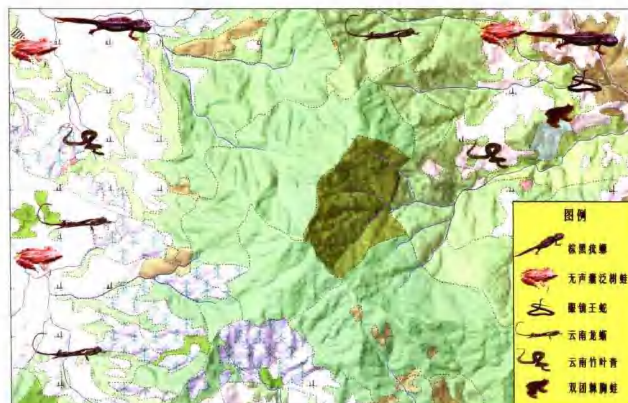


兽类分布图(局部)





鸟类分布图(局部)



两栖爬行类分布图(局部)