绿色的希望

—中国的生物圈保护区

LIFE IN GREEN KINGDOMS

BIOSPHERE RESERVES IN CHINA

中国人与生物圈国家委员会　编著

Published by
Chinese National Committee for
Man and the Biosphere Programme

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内容提要

本书首次以图文并茂，中、英文对照的形式向读者展示了中国纳入联合国教科文组织人与生物圈计划世界生物圈保护区网络的14个生物圈保护区。它们是中国最深的高山湖泊——“天池”的长白山，北回归线上的绿洲——鼎湖山，举世闻名的“大熊猫之乡”——卧龙，有“世界独生子”之称的黔金丝猴产地和佛教圣地——梵净山，“昆虫世界”——武夷山，欧亚大陆典型草原——锡林郭勒，浓缩了从高山冰雪带至森林、草原、荒漠、绿洲、农田等垂直带系列的博格达峰，有“野人”传说和“白化动物”之谜的神农架，被誉为“鹤乡”的盐城，“生物多样性和文化多样性共存的热带之乡”——西双版纳，“喀斯特森林明珠”——茂兰，被誉为“大树王国”的天目山，完整保存了原始红松林的丰林，美妙奇幻的著名风景区——九寨沟。

该书以生动活泼、通俗易懂的语言，介绍了各生物圈保护区的自然、地理和人文景观特点、重点保护对象，以及保护、科研、发展现状和生态旅游信息；是从事自然保护和科研的各界人士，大、中专学生及所有热爱大自然和生态旅游爱好者的良师益友。

Synopsis

This is the first book to introduce China's 14 Biosphere Reserves which were designated by UNESCO as part of the MAB World Network of Biosphere Reserves. The 14 are: Changbaishan Biosphere Reserve, enjoying China's largest and deepest alpine lake-Sky Lake; Dinghushan Biosphere Reserve, the "Oasis in the Tropic of Cancer"; Wolong Biosphere Reserve, the world-renowned "Home of the Giant Panda"; Fanjingshan Biosphere Reserve, the only distributional area of Guizhou golden monkey and a famous holyland of Buddhism; Wuyishan Biosphere Reserve, "The kingdom of Insects"; Xilingol Biosphere Reserve, the typical grassland of Eurasia; Bogeda Biosphere Rserve, displaying the vertical zonation of landscape from alpine ice and snow, forest, grassland, desert to oasis and farm land in a concentrated area; Shennongjia Biosphere Reserve, painted with the Mystery of Wild Men and albino animals; Yancheng Biosphere Reserve, the "Native Land of Cranes"; Xishuangbanna Biosphere Reserve, the beautiful tropical land with biological and cultural diversity; Maolan Biosphere Reserve, "The Rarity among Karst Forests"; Tianmushan Biosphere Reserve, praised as the "Paradise of Big Trees"; Fenglin Biosphere Reserve, with its primeval Korean pine forest; and Jiuzhaigou Biosphere Reserve, a fairyland in the world.

With illustrative pictures and using common words as far as possible, this bilingual book in Chinese-English provides readers important information about these reserves, i. e., the characteristics of the natural, geographical and human/cultural landscapes, main objectives for protection and the status of conservation, research, development and ecotourism. It serves as a good teacher and helpful friend not only for the people involved in management and research of nature conservation, but also for students at the levels of college, vocational school and high school, as well as all those who have a love for nature and who love ecotourism.

献给中华人民共和国人与生物圈国家委员会成立二十周年!

In Commemoration of the 20th Anniversary of the Founding of the Chinese National Committee for Man and the Biosphere Programme!

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致　谢

《绿色的希望——中国的生物圈保护区》一书是一项集体成果，在编写过程中得到了广泛的支持，特别要感谢联合国教科文组织驻北京办事处为该书的出版给予资金援助。还要感谢提供基础资料的14个生物圈保护区及如下各位人士：

陈佐忠　扈魁英　李荣禄　梁丽琴　刘先华　刘希平　苗　河　魏　平　徐庭煜
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中国人与生物圈国家委员会
1997年9月

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《LIFE IN GREEN KINGDOMS—BIOSPHERE RESERVES IN CHINA》as a book, is a collective effort, which has obtained widely support from various units. We special thank the Beijing Office of UNESCO for its funding support. We also thank 14 biosphere reserves and so many individuals who have provided basic materials, their names as follows:

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the Chinese National Committee for MAB
September 1997

序

生物圈保护区是一些具有适当的分区和管理机制的陆地和海岸带(或海洋)生态系统。这些生态系统以及它们的生物多样性的保护与自然资源的持续利用相协调,以保障当地居民社区的利益;并为有关的研究、监测、教育和培训活动提供条件。联合国教科文组织人与生物圈计划是一项多学科的研究与培训计划;通过自然与社会科学相结合,为生物圈的资源保护与合理利用提供科学依据,从而为改善全球人类与环境之间的关系奠定基础。

人与生物圈计划自联合国教科文组织于 1971 年发起实施以来,至今已发展成为该组织的重要计划之一,并已在全球 128 个成员国中通过他们的人与生物圈国家委员会开展了广泛的活动。截至 1997 年底,已有 87 个国家的 352 个生物圈保护区被纳入人与生物圈计划的世界生物圈保护区网络。

中国人与生物圈国家委员会是世界上开展活动最积极的国家之一,世界生物圈保护区网络中已包含中国的 14 个生物圈保护区。中国是一个拥有从热带到寒带多种气候类型的大国,因此她的生物圈保护区类型也就丰富多样。

我非常高兴地看到《绿色的希望——中国的生物圈保护区》一书的出版,该书用简练的语言和精美的照片为读者展示了纳入世界生物圈保护区网络的 14 个多彩的生物圈保护区。中国人与生物圈国家委员会为此书的出版精心工作,我们衷心地感谢他们所作出的贡献。

并表示我由衷的祝贺。

联合国教科文组织驻中国、蒙古、朝鲜办事处

代表

1997 年 9 月 30 日

Preface

Biosphere Reserves are areas of terrestrial and coastal/marine ecosystems, which have appropriate zoning patterns and management mechanisms. The conservation of ecosystems and their biological diversity are combined with the sustainable use of natural resources for the benefit of local communities and with relevant research, monitoring, education and training activities. The Man and the Biosphere (MAB) Programme of UNESCO is an interdisciplinary programme of research and training intended to develop the basis, from within the natural and social sciences, for the rational use and conservation of the resources of the biosphere, and for the improvement of the global relationship between people and the environment.

UNESCO launched the Man and the Biosphere Programme in 1971, and it has since developed into one of UNESCO's major programmes. MAB has its wide-ranged activities in 128 Member States, implemented through their National Committees. By the end of 1997, there were 352 Biosphere Reserves in 87 countries designated under this programme.

China-MAB is one of the most active National Committees in the world. The World Biosphere Reserve Network includes 14 Chinese Biosphere Reserves. As China is such a gigantic country embracing varied climate from tropical to frigid zone, different kinds of Biosphere Reserves are identified.

I am very pleased to see the book《Life in Green Kingdoms-Biosphere Reserves in China》published. All of China's 14 international Biosphere Reserves are described with excellent words and photos. The Chinese National Committee for MAB has done an excellent work of this publication. We sincerely appreciate their contribution.

With my heartfelt congratulations,

Director
UNESCO Representative to China, Mongolia and DPR Korea
September 30, 1997

前　言

在中国自然保护区建立的初始阶段，其主要目的是及时抢救尚未被破坏的自然生态系统，以保护重要的原始本底。但长期的实践证明这种传统的封闭式保护仍然要经受自然和人类引起的各种干扰，尤其在中国的大多数自然保护区中还有世代生活的当地居民，保护区的自然资源是他们维持生命系统的重要支柱，从而导致自然保护区面临严峻的挑战。如果没有科学的方法对资源进行合理利用，有效保护便难于实现。

自联合国教科文组织发起的人与生物圈计划在中国实施后，一种新型的自然保护思想——生物圈保护区传入中国；特别是 1979 年中国第一批生物圈保护区被批准纳入世界生物圈保护区网络以来，这一新概念逐渐被从事自然保护事业的科学家、管理人员以及政府决策人员所接受，原有的传统逐渐改变，建立起各种新型的科学管理模式，使自然保护区逐渐走上一条实现生态效益、社会效益、经济效益同步的持续发展道路，这对中国的自然保护事业是一个重要的转折。国务院于 1994 年颁布的《中华人民共和国自然保护区条例》中便吸收了生物圈保护区概念的新观点。

生物圈保护区概念首先把保护区看作是一个开放式的系统，打破了传统的封闭式保护，通过对保护区在空间结构上划分核心区、缓冲带和过渡区的方法，为实现保护、研究、监测、教育、培训以及发展的多种功能提供了适宜的场所。其次是重视人对生物圈的影响，把世代生活在这里的居民视为这一开放系统中的重要成员和最活跃的因素，使在资源利用活动中与自然相协调的传统技能得以保存，并与科学方法输入的新技术相结合，参与资源的管理，这就激发了当地居民的主人翁意识，把长期难于解决的保护与发展之间的矛盾化解为和谐的关系。为进一步扩大生物圈保护区在中国的实践，促进中国自然保护事业的发展，中国人与生物圈国家委员会于 1993 年成立了中国生物圈保护区网络，加入网络的 66 个成员通过对生物圈保护区概念的长期研究与实践，在实现生态环境、资源管理与保护相互协调，促进当地的社会—经济共同发展都具有各自不同的特色，取得了值得称道的成果。为尽快传播他们的成功经验，中国人与生物圈国家委员会精选了已被纳入世界生物圈保护区网络的 14 个生物圈保护区向读者介绍。希望这些

保护区所展示的自然风光能给予你美的享受，资源管理的成功经验能有所获益。

该书的出版是一项集体合作的成果，得到了联合国教科文组织驻北京办事处的经费资助以及各生物圈保护区提供的资料。我仅代表中国人与生物圈国家委员会对他们的热情支持表示衷心的感谢。

赵献英
中国人与生物圈国家委员会秘书长
1997 年 9 月 18 日

Introduction

In the early phase of the development of China's Nature Reserves the main goal was to take emergency measures to save the undisturbed and endangered natural ecosystems so as to preserve the important original background of nature. However, this conventional type of closed management was proven, through long-term practice, to be unsuccessful and the reserves still suffered from various kinds of natural and human induced disturbances. This was particularly so in China's condition that there are many local residents living for generations in most of the Nature Reserves with natural resources as their mainstay of life. As a result, serious challenges were encountered by Nature Reserves. Evidence mounted to suggest that the realization of effective protection is not possible without scientific methods to rationally use the resources.

Luckily, a novel idea of nature conservation, the Biosphere Reserve concept, has been introduced to China with the implementation of the UNESCO Man and the Biosphere Programme. Since the first group of China's Biosphere Reserves were designated by UNESCO in 1979, this new idea has been gradually recognized by scientists and managers involved in nature conservation and by the decision-makers in the governments. Conventional management was then changed gradually into various innovative models of scientific management, which provided approaches to sustainable development of the reserves with ecological, social and economic benefits brought simultaneously. That marked a great turning point in the cause of nature conservation in China. The new Biosphere Reserve concept was absorbed in the "Regulation of the People's Republic of China on Nature Reserves" promulgated by State Council in 1994.

The Biosphere Reserve concept considers primarily the reserve as an open system, breaking the traditional management of closed protection, with a special zonation of core area or areas, buffer zone and transition area to provide appropriate sites for its multiple functions of protection, research, monitoring, education, training and development. It views highly the human effects on Biosphere Reserves, that is to say, putting

the residents of generations into the most vigorous position in this open system, and so the traditional techniques and skills in the use of resources can be maintained if they are compatible with nature, and can be combined with new ones which are based on scientific methodologies; and encouraging the local people to participate in management. In so doing the local people are inspired to make themselves the stewards of nature, and thus the long existing contradiction between conservation and development becomes harmonized. In order to further extend the prompt implementation of the Biosphere Reserve concept in China, fostering China's Nature Reserve movement, the Chinese National Committee for MAB built China's Biosphere Reserve Network (CBRN) in 1993. Through active research and performance of the Biosphere Reserve concept over the years, the 66 CBRN members have made encouraging progress in actually reconciling resource management and ecological and environmental protection; they have made contributions to local socio-economic development in their own distinctive ways.

Seeing that there is an urgent need to publicize their successful experience as soon as possible, the Chinese National Committee for MAB carefully selected descriptions of the 14 Biosphere Reserves which have been designated as members of WBRN, for the readers information. It is our sincere hope that the natural landscapes of the reserves will give you aesthetic enjoyment, and that their experiences in resources management will be helpful to you.

Doubtless the publishing of this book is a collective effort, which has been supported by grants from the Beijing Office of UNESCO and materials from various Biosphere Reserves. On behalf of the Chinese National Committee for MAB, I express my heartfelt gratitude to them for their warm support.

Zhao Xianying
Secretary-General
Chinese National Committee for MAB
September 18, 1997

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联合国教科文组织世界生物圈保护区网络示意图

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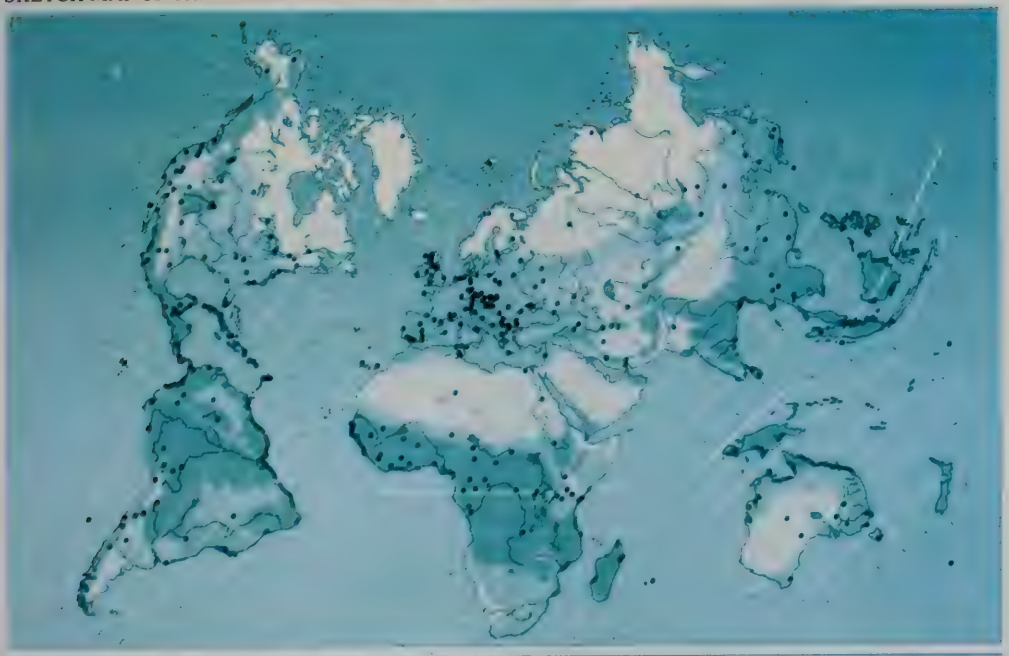

中国生物圈保护区分布图

DISTRIBUTION OF BIOSPHERE RESERVES OF CHINA

丰林 Fenglin

博格达 Bogeda

锡林郭勒 Xilingol

长白山 Changbaishan

北京 Beijing

Huanghe

九寨沟 Jiuzhaigou

盐城 Yancheng

神农架 Shennongjia

卧龙 Wolong

Changjiang R.

天目山 Tianmushan

梵净山 Fanjingshan

茂兰 Maolan

武夷山 Wuyishan

西双版纳 Xishuangbanna

鼎湖山 Dinghushan

生物圈保护区 Biosphere Reserve

生物圈保护区强调多功能，即：生物多样性及其生态过程的保护功能；提供科研、监测、培训、环境教育、信息交流的后勤基地功能及持续发展功能。

The Biosphere Reserve are the multiple functions to be stressed. These functions include conservation of biodiversity and ecological processes; the logistical functions supporting research, monitoring, environmental education and information exchange and the sustainable development functions.

人与生物圈计划及其中国的生物圈保护区

人与生物圈计划及其所包含的生物圈保护区已在中国实施近20年，但仍不为人们所广泛熟知。《绿色的希望——中国的生物圈保护区》一书，旨在介绍我国14个五彩缤纷、各具特色的生物圈保护区，使读者对这一全球开展的国际计划的精髓有所了解，促进中国自然保护事业的发展。

什么是人与生物圈计划？

人与生物圈计划（Man and the Biosphere Programme，简称MAB计划），是联合国教科文组织（UNESCO）针对全球面临的人口、资源、环境问题，于1971年发起的一项政府间跨学科的大型综合性研究计划。旨在通过全球范围的合作，达到如下目标：(1)用生态学的方法研究人与环境之间的关系；(2)通过多学科、综合性的研究，为有关资源和生态系统的保护及其合理利用提供科学依据；(3)通过长期的系统监测，研究人类对生物圈的影响；(4)为提高对生物圈自然资源的有效管理而开展人员培训和信息交流。到目前为止，已有100多个国家参加了该计划，并建立了国家委员会，负责该计划在本国的实施。

中国MAB国家委员会于1978年经国务院批准建立。新一届委员会由各有关政府部门官员、知名科学家及新闻界和学术团体的代表共41人组成。中国MAB国家委员会的常设机构——中国MAB秘书处，设在中国科学院，负责日常工作。近20年来，执行和协调了国际MAB计划有关的大量国际、国内合作项目及各类活动在中国的蓬勃开展。

什么是生物圈保护区？

生物圈保护区是纳入MAB计划并在国际上得到公认的、具有代表性的陆地和沿海受保护的区域。它区别于其他各类自然保护区的突出特点是强调多功能，即：对生物多样性及其生态过程的**保护功能**；提供科学研究、监测、培训、环境教育、信息交流的**后勤基地功能**；注重自然生态系统的保护与资源利用的相互协调，建立资源持续利用模式，对周围同类地区提供示范的**发展功能**。每个生物圈保护区通过在空间结构上设置的核心区、缓冲带和过渡区3个区域，来实现上述

三大基本功能。

核心区——每个生物圈保护区必须包括一个或多个核心区。核心区是根据明确的保护目的,受到严格保护的、自然的或仅受到最低限度人为影响的典型生态系统。它有明确的边界,还要有足够大的面积,以满足所栖息的动植物种群正常进化所要求的活动空间,从而实现有效保护,确保被保护的生态系统可以通过自我调节维持系统的稳定和自然演化过程。核心区内只能开展对环境没有明显改变作用的少数科研、监测活动。

缓冲带——在核心区外围或与核心区毗连,具有明确的边界,并且常与核心区相一致。可用于开展与核心区保护相适应的研究、教育、培训及生态旅游等活动。

过渡区——在缓冲带的外围,可开展资源合理利用的研究、试验与示范。建立保护与持续发展相协调的示范基地,旨在向周边地区推广和扩展,促进周围社区环境－经济－社会的协调发展。因此,该区域是一个开放系统,可以没有明确的边界。

生物圈保护区的三大功能通过与3个区域的空间结构有机结合而得到体现和发挥,这就是生物圈保护区的主要特点。

中国的生物圈保护区及其网络开展了哪些活动?

生物圈保护区是在UNESCO/ MAB计划下发起建立的,它是MAB计划的最重要实施基地。自1976年在世界范围建立第一批生物圈保护区以来,至1997年,已在87个国家建立了352个生物圈保护区,基本上覆盖了全球陆地上各类生物地理区域,形成世界生物圈保护区网络(WBRN)。中国已有14个保护区被批准纳入该网络。这些保护区,无论是所保护的物种、自然景观或生态系统还是其在发挥保护、科研、教育、培训和发展等多功能方面,都是中国众多自然保护区中的佼佼者。它们保存了众多珍稀、濒危、特有物种和原始自然本底,是生物多样性和文化多样性最丰富、自然生态系统及自然景观和人文景观保存最完好的精华所在。

为了推动生物圈保护区概念的实施,促进中国自然保护区的科学管理和持续发展,使更多的自然保护区走向世界,扩大交流与合作,中国MAB国家委员会于1993年建立了中国生物圈保护区网络(CBRN)。网络成员除了已纳入WBRN的14个生物圈保护区外,还吸收了大部分国家级自然保护区,作为WBRN的后备力量。成员数量由建立之初的45个扩展到目前的66个,包括了全国各部门管理的各种生态系统类型的自然保护区。CBRN建立后,制定了行动计划,并在国际

合作、科学研究、培训、信息交流、持续发展等领域开展了一系列活动：创办和出版了网刊——《中国生物圈保护区》定期中文季刊和不定期英文专刊、中英文通讯、MAB 计划中英文介绍手册及计算机主页(HOMEPAGE)，以及其他多种出版物在国内外开展信息交流；在不少保护区开展了国际、国内合作，如地理信息系统(GIS)用于保护区管理、生态旅游管理和规划、生物技术运用等科学合作研究项目；举办各种类型的人员培训、专题研讨和对生物圈保护区的评估；组织保护区管理人员参与国际交流和互访；建立跨国界保护区和姊妹保护区等等。CBRN 的建立及其开展的活动，促进了中国自然保护事业向纵深发展，同时也推动了东亚地区生物圈保护区网络(EABRN)的建立与发展，受到广泛的国际关注和赞赏。1996 年，世界保护联盟(IUCN)的世界保护区委员会(WCPA)将其为表彰在自然保护事业中做出突出贡献的集体或个人的最高荣誉奖——弗雷得·帕卡德奖(Fred M. Packard Award)，授予中国 MAB 委员会。

人与生物圈计划及生物圈保护区的概念，经过 20 多年的发展和实践已得到世界公认。特别是 1992 年联合国环境与发展大会(UNCED)上 100 多个国家签署的《生物多样性公约》和《21 世纪议程》，又赋予了 MAB 计划及其生物圈保护区新的使命。生物圈保护区已成为实施《生物多样性公约》和《21 世纪议程》的重要基地，体现出生物圈保护区在全球环境与发展领域中的重要地位和作用。中国 MAB 及其 CBRN 将一如既往地为全人类的持续发展作出应有的贡献。

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Man and the Biosphere Programme and Its Biosphere Reserves in China

Although around 20 years have passed since the establishment of the Man and the Biosphere (MAB) Programme and its Biosphere Reserves in China, they are still unfamiliar to most people. The book《Life in Green Kingdoms-Biosphere Reserves in China" is thus aiming at publicizing our 14 Biosphere Reserves, which are colourful and each with distinct characteristics. This book enables readers to have an understanding of the essence of this on-going world programme and promotes the development of China's nature conservation.

What is the Man and the Biosphere Programme?

The Man and the Biosphere (MAB) Programme was launched by The United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1971 as an intergovernmental large-scale programme with multi-disciplinary teams. The programme focuses on the population, resources and environment problems that the world faces. The programme is carried out via worldwide cooperations with the goals as follows: (1) to study the interaction between humans and environment by using ecological methodologies, (2) to provide a scientific basis for the conservation and proper use of resources and ecosystems through multi - disciplinary and comprehensive research, (3) to study the impact of human activities on the biosphere by means of long-term systematic monitoring and (4) to make training and information exchange for capacity building of the effective management of natural resources in Biosphere Reserves. To date, there have been over 100 countries involved in the programme and with their national committees, they are in charge of the implementation of the programme within their own countries.

The Chinese National Committee for MAB was founded in the wake of the State Council's approval in 1978. The latest session of the Committee is composed of 41 members including senior level officers from the relevant departments of the government, well-known scientists and representatives from the press and academic organizations. The permanent office, the Secretariat of the Chinese National Committee for MAB is

situated in the Headquarters of the Chinese Academy of Sciences. The secretariat is responsible for routine duties in support of the MAB programme. During the last two decades it has conducted and coordinated many cooperative programmes and activities related to the MAB Programme both internationally and nationally, and has made tremendous efforts to ensure that those activities are vigorously developed in this country.

What is a Biosphere Reserve?

Biosphere Reserves are areas of representative terrestrial and coastal / marine ecosystems, or a combination thereof, which are internationally recognized within the framework of UNESCO's MAB Programme. The key features which distinguish Biosphere Reserves from national parks, nature reserves and other protected areas are the multiple functions to be stressed. These functions include conservation of biodiversity and ecological processes; the logistical functions supporting research, monitoring, training, environmental education and information exchange; and the development functions offering demonstrations to the peripheral areas of a similar nature, which highlight the reconciliation of conservation of ecosystems and use of natural resources to create the model of sustainable development of resources. Each Biosphere Reserve is expected to define core areas, buffer zones and transition areas in its spatial frame to perform the above mentioned three functions.

Core area – each Biosphere Reserve includes one or more core areas, which are strictly protected according to well defined conservation objectives and consist of typical samples of natural or minimally disturbed ecosystems. Core areas are usually delineated and should be large enough to be effective in situ conservation units for the demands of space for the natural evolution of the populations of plants and animals, so as to ensure that the stability of the protected ecosystem and its natural evolution can be maintained through self-regulation. Therefore, only few activities of non-destructive research and monitoring are allowed within the core areas.

Buffer zone – surrounds or adjoins the core areas. It must be strictly delineated and very often corresponds together with the core areas. It can be used for research, education, training and ecotourism which are conducive to the protection of core areas.

Transition area – surrounds the buffer zone and is used for carrying out research, experimentation and demonstration of rational use of resources. The establishment of a demonstration base for the reconciliation of conservation and sustainable development is in an attempt to publicize the successful initiatives and to extend them to the appropriate areas encouraging environmentally sound socio-economic development of the communities. Obviously, the transition area is an open system, which is not strictly delineated.

The full performance of the three convergent functions, based on the zonation of three areas (core area, buffer zone and transition area) characterizes Biosphere Reserves.

What has been done by China's Biosphere Reserves and their network, the CBRN?

Biosphere Reserves were established under UNESCO's MAB Programme. They are the most important sites where the MAB Programme is implemented. The first sites were designated in 1976 and by 1997 there have been 352 Biosphere Reserves located in 87 countries within the framework of the World Network of Biosphere Reserves (WBRN). These reserves cover almost every type of bio-geographical region. There are 14 Nature Reserves in China designated as members of WBRN. They are outstanding reserves from amongst the large number of China's Nature Reserves, in terms of either the protected species and natural landscape or their multiple functions of conservation, research, education, training and development. They have preserved great numbers of rare, endangered and endemic species as well as natural habitat. They are the places which hold the richest biological diversity and cultural diversity and they are the essential sites where natural ecosystems, natural landscapes and human cultural landscapes are best preserved.

In order to accelerate the implementation of the Biosphere Reserve concept and thereby promote scientific management and sustainable development of Nature Reserves in China, creating sufficient conditions to enable more Nature Reserves to contact the world and widening exchange and cooperation, the Chinese National Committee for MAB set up China's Biosphere Reserve Network (CBRN) in 1993. In addition to the 14 Biosphere Reserves accepted by WBRN, the CBRN members include most of the rest of the national Nature Reserves as candidates of WBRN. The membership has increased from 45 at the founding of the network to the present 66, which cover all the various types of ecosystems with Nature Reserves and include the administration of different sectors of China. After its founding, the CBRN has prepared an action plan, and carried out a series of activities in the fields of international cooperation, research, training, information

exchange and sustainable development. Some of the concrete tasks taken include work on publications: a quarterly network journal "China's Biosphere Reserves" in Chinese with occasional special English issues, a Newsletter in both Chinese and English, a brochure of China's MAB Programme and its CBRN in Chinese and English, the creation of the China MAB homepage, and a variety of other publications facilitating information flow at home and abroad; cooperative programmes between several selected reserves and foreign countries: the research projects on Geographic Information System (GIS) application in reserve management, the management and planning of ecotourism, application of biological technologies, etc.; organizing various kinds of training courses and seminars and conducting peer and expert reviews of Biosphere Reserve management; and organizing international exchanges and visits for the staff of the reserves and establishing transboundary reserves and sister Nature Reserve relationship. The establishment of CBRN with its activities has furthered the cause of nature conservation in China and also encouraged the establishment and development of East Asian Biosphere Reserve Network (EABRN), which has received world acclaim. In 1996, World Commission for Protected Areas (WCPA) of the World Conservation Union (IUCN) presented the Fred M. Packard International Park Merit Award to the Chinese National Committee for MAB, which is their highest award to individuals or organizations for their outstanding services in nature conservation.

The MAB Programme and the Biosphere Reserve concept have been internationally recognized through its development in the last two decades. The MAB Programme and its Biosphere Reserves are poised to take on a new role for implementing the "Convention on Biological Diversity" and the "Agenda 21" signed by more than 100 countries at and after the United Nations Conference on Environment and Development (UNCED), which shows the significant role Biosphere Reserves play in the world's environment and development. The Chinese National Committee for MAB with its CBRN will, as always, continue to make its dutiful contributions to the sustainable development of humankind.

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▲ 长白山天池

Sky Lake-volcanic lake of Changbaishan

▶ 长白山飞瀑

Waterfall in Changbaishan.

▲ 被誉为“东北三宝之一”的梅花鹿
Sika deer *(Cervus nippon)*, a kind of animal known as one of "Three Treasures in Northeast China".

▲ 被誉为“东北三宝”之一的人参
Ginseng *(Panax ginseng)*, a kind of plant known as one of "Three Treasures in Northeast China".

▶ 被誉为“东北三宝之一”的紫貂
Sable *(Martes zibellina)*, a kind of animal known as one of "Three Treasures in Northeast China".

长白山生物圈保护区

地理位置:吉林省安图、抚松、长白县境内
面　　积:196 465hm^2
海　　拔:720～2 691m
保护对象:温带山地森林生态系统及自然历史遗迹、珍稀动、植物
建区时间:1960 年
晋升国家级自然保护区:1986 年
纳入联合国教科文组织世界生物圈保护区网络:1979 年

位于中、朝两国边境上的长白山,是一座历史悠久、气势雄伟、景色秀丽的高大火山锥体。因其山体较长,灰白色、浅黄色火山渣居半,加之冬夏积雪,四时望之洁白一色,故名长白山。她象无形的化石,记录了人类活动的脚印和历史变迁的痕迹。距今约 300 万年前第三纪末的一次剧烈的火山活动,基本上奠定了目前由火山喷发的熔岩堆积而成的长白山地貌景观。

长白山是欧亚大陆北半部、亚洲东部温带典型的山地森林生态系统,是北半球同纬度地带自然状态保存最好、生物多样性最丰富的区域之一。尤以其山地垂直带景观浓缩了水平地带的温带、寒带和极地的主要景观。从最低处的河谷至山顶,依次分布着红松(*Pinus koraiensis*)针阔叶混交林、暗针叶林,以及在中国只有长白山才能见到的亚高山岳桦(*Betula ermanii*)矮曲林和以灌木、草本为主的高山冻原。

长白山汇聚了众多的植物类型,野生植物达 2 500 余种,有红松、水曲柳(*Fraxinus mandshurica*)、黄菠萝(*Phellodendron amurensis*)等古老的第三纪残留种;有笃斯越桔(*Vaccinium uliginosum*)、侧根蓼(*Polygonum ochotense*)等随冰川南移而滞留下来的植物种;有北五味子(*Schisandra chinensis*)、山葡萄(*Vitis amurensis*)等在间冰期由暖温带向北移的植物种;以及长白松(*Pinus densiflora* var. *sylvestriformis*)、长白柳(*Salix polyadenia* var. *tschanbaischanica*)等长白山特有种。其中,被列为国家重点保护的珍稀濒危物种:人参(*Panax ginseng*)、瓶尔小草(*Ophioglossum thermale*)、刺参(*Oplopanax elatus*)、草苁蓉(*Boschniakia rossica*)等 25 种。此外,有闻名遐迩的人

长白山旅游示意图

Tourism Map of Changbai Mountain

参、刺人参(*Echinopanax elatus*)、刺五加(*Eleitherococcus senticossus*)、贝母(*Fritillaria ussuriensis*)、天麻(*Gastrodia elat*)等药用植物资源达800余种。

长白山还有昆虫1 800余种,脊椎动物300余种,其中有被列为国家一、二级保护的动物东北虎(*Panthera tigris amoyensis*)、梅花鹿(*Cerus nippon*)、黑熊(*Selenarctos thibetanus*)、中华秋沙鸭(*Mergus squamatus*)等50余种。

长白山自然地理景观和森林生态系统的特殊性,历来受到中外学者的关注。早在清代就有日本、英国的学者来此登山考察。新中国成立后,中国科学院在此建立了森林生态系统定位研究站,并组织了多次科学考察。区内还有火山地震观测站、水文站、气象站等机构,进行长期定位研究、观察工作,成为我国重要的研究和环境教育基地。保护区同国、内外开展了广泛的合作与交流,取得多项科研成果。与美国人与生物圈国家委员会合作进行的生物圈保护区对比研究、与韩国合作进行的生态旅游管理研究、与日本、德国、加拿大等国进行的一些重大国际合作研究项目,以及与国内科研单位合作开展的地理信息系统研究项目,将促进长白山生物圈保护区的管理迈上新台阶。长白山生物圈保护区与朝鲜的白头山自然保护区相邻,为今后开展跨国界保护区的双边合作提供了条件。

长白山保护区内没有居民点,外围是朝鲜族、满族人民集聚的地区。他们有着利用当地资源的传统知识和悠久的历史文化。被誉为东北三宝的"人参、貂皮、鹿茸角"就主产于长白山。当地群众称之为百草之王的人参,作为补药之首,已有2 000多年的药用历史,在中药史上享有极高的地位。在中国人工栽植亦有400多年的历史,目前在长白山周围有20多个县建有人参栽植场。鹿茸,以其"得天之精"而成为举世闻名的滋补品,养鹿业在保护区周边地区也有100多年历史。貂皮,为鼬科动物紫貂(*Martes zubellina*)的名贵皮毛,素为裘皮之冠。紫貂的笼养亦已成功,现已建立了种貂扩繁基地。这些种植、养殖业的发展已经成为长白山生物圈保护区周边地区人民的主要经济收入来源,减少了向自然保护区盲目采、挖、捕杀和猎取的现象。

长白山保护区是我国成立较早,同时也是中国第一批被纳入联合国教科文组织世界生物圈保护区网络的保护区之一。其管理机构设施完善,拥有800余名职工,特别是有一支200余人的森林警察队伍,担负着森林保护的重任。区内防火体系完善,实现了30多年无火灾。

长白山生物圈保护区充分利用其面积超过2 000 m^2的长白山自然博物馆,及其馆内四个大厅中陈列的1 300余件标本、生动的模型、图片、资料,以及自己创办的刊物《长白山自然保护》等

条件，进行信息交流和科普教育，已经成为科研、教学实习和公众教育基地，是目前在中国有较大规模自然博物馆和自已创办刊物的少数保护区之一。

长白山丰富的旅游资源名扬海内外。座落在长白山顶的天池，是中国最大、最深的火山口湖（水面 9.8km^2，最深处 373m），16 座奇峰峻岭围湖耸立，天池北侧有一缺口，形成落差 68m 飞流直泻的瀑布，蔚为壮观。绚丽多彩的自然景观，幽深的谷底森林，及其周边地区的历代古墓群、近代革命烈士纪念碑、塔，“安图人”洞穴遗址、集安市北郊的人面石刻等古今人文景观，吸引了众多中外观光旅游者和科学工作者。尤以高山滑雪场吸引了众多冰雪旅游运动爱好者，使长白山成为全年性旅游的胜地。每年到长白山旅游、考察的人数达 20 余万，其中借邻近之便的韩国游客近年来逐年增多。

生态旅游已经成为长白山生物圈保护区的支柱性产业，每年的旅游收入近千万元，增强了保护区自身的经济实力。同时带动了周边地区经济的发展，当地居民年人均收入较 80 年代初期增加近 10 倍。但是随着旅游人数的逐年增加，伴随旅游带来的负面影响威胁到旅游资源能否持续利用的问题。长白山生物圈保护区遵循 1988 年由吉林省人民政府人大通过并颁布的《长白山国家级自然保护区管理条例》，制定了《长白山森林旅游总体发展规划》，并纳入省总体规划之中。保护区建立了专门的旅游局，对旅游景点和路线作了规划设计，进行统一组织和管理，它将为长白山的保护与生态旅游协调发展注入新的活力。

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Changbai Shan Biosphere Reserve

Location: Antu, Fusong and Changbai Counties of Jilin Province
Area: 196 465 hm^2
Altitude: 720 ~ 2 691 m
Main objectives for protection: temperate mountain forest ecosystem and natural and historical relics
Established: 1960
National Nature Reserve designation: 1986
UNESCO World Biosphere Reserve designation: 1979

Changbaishan in Chinese is a long stretched mountain looking white all the season. The "white" results from its gray and yellowish volcanic debris particularly when covered by snow the whole year. The mountain has witnessed geological changes and related human activities throughout its history. The present mountain landscape was basically formed by the last violent volcanic eruptions at the end of the Tertiary, about 3 million years ago.

The mountain is the typical mountain forest ecosystem of the northern Eurasian Continent and the temperate zone of East Asia. It is also one of the well-preserved natural areas with the richest biodiversity among those distributed in the same latitude of the northern hemisphere. The mountain is famous for the vertical zonation of mountain vegetation, which roughly amounts to a microcosm of the main landscape of the temperate, cold and arctic zones on the horizontal zonation. Thus, the mixed Korean pine (*Pinus koraiensis*) – broadleaf forest, the dark coniferous forest and the sub-alpine ermans birch (*Betula ermanii*) -krummholz forest occurs only in this mountain in terms of China's vegetation. This as well as the alpine tundra dominated by low shrubs and grasses are distributed orderly from the valley at 600 m to the top at 2 691 m.

Among the 2 500 odd wild plants are the ancient relics of the Tertiary, such as Korean pine, Manchurian ash (*Fraxinus manchuricas*) and Amur cork tree (*Phellodendron amurensis*); the relics left when the glacier moved south, e. g., bog bilberry (*Vaccinium uliginosum*), knotweed (*Polygonum ochotense*); the species which have moved northwards from the temperate zone during

the interglacial period, e. g., Chinese magnoliavine (*Schisandra chinensis*), Amur grape (*Vitis amurensis*); and the endemics such as Changbai Scotch Pine (*Pinus densiflora* var. *sylvestriformis*) and willow (*Salix polyadenia* var. *tschanbaischanica*). Twenty – five species have been listed as rare and endangered species of State priority for protection, e. g., ginseng, (*Panax ginseng*), Liliturf (*Ophioglossum thermale*), tall oplopanax (*Oplopanax elatus*) and Russian boschniakia (*Boschniakia rossica*). Over 800 species are medicinal plants, among which ginseng, *Echinopanax elatus*, *Eleitherococcus* senticossus, Ussuri fritillary (*Fritillaria ussuriensis*) and tall gastrodia (*Gastrodia elata*) are the best.

In addition, there are more than 1800 insect species and over 300 species of vertebrates, of which 50 species are designated in the first and the second classes of the State conservation species respectively, including tiger (*Panthera tigris amoyensis*), sika deer (*Cerus nippon*), black bear (*Selenarctos thibetanus*) and Chinese merganser (*Mergus squamatus*).

The peculiarities of the natural geographic landscape and forest ecosystem of Changbaishan Mountain have long attracted the interest of scientists at home and abroad. Earlier in the Qing Dynasty the Japanese and British scientists came here pursuing mountaineering and investigation. Since the founding of New China a permanent station for forest ecosystem research has been established with lots of scientific surveys taken place by the Chinese Academy of Sciences. Also, other institutes like volcano and earthquake observatories, the hydrologic station and the meteorologic station have conducted long term observations and research work. Changbaishan Biosphere Reserve has become an important site for research and environmental education. A wide spectrum of cooperation and exchange exists between partners in and out of the country and a lot of scientific results have been obtained so far. Among others, "The Comparative Study of Biosphere Reserves" prepared jointly with the United States National Committee for MAB; "Management of Ecosystem" with the Republic of Korea; some important international programmes with Japan, Germany and Canada; and GIS projects with many research institutes in China, have been increasing the level of management of Changbaishan Biosphere Reserve to a new high. The fact that the Changbaishan Biosphere Reserve borders on the White Capped – Mountain Nature Reserve of the Democratia Peoples' Republic of Korea is doubtless conducive to bilateral cooperation of transboundary conservation.

No residents are in the reserve, but minority people of Korean and Manzu nationalities who have traditional knowledge of local resource utilization in their long history are concentrated in the surrounding areas. The pride of three treasures in Northeast China i. e. ginseng, marten coat and deer – pilose antler are produced mainly in Changbaishan Mountain. Ginseng, the "king of herbs" has been used as the first – choice tonic in traditional Chinese medicines for more than 2 000 years. It has also been cultivated in China for over 400 years. At present, there are many ginseng plantations in 20 counties around the mountain. Since the deer – pilose antler has a worldwide reputation for its tonic function, the deer raising industry around the mountain enjoys a history of more than 100 years. Sable (*Martes zibellina*) is the animal from which the rare and best commercial marten coat is based. Following the success of marten cage breeding, the base for extensive cage breeding has been created. The development of all those industries mentioned above generates the majority of the income of the people living in the peripheral areas of Changbaishan Biosphere Reserve. This in turn has reduced the harmful activities of unrestrained picking, digging and poaching, which were the prevailing uses of natural resources in the past.

The reserve has a fairly complete administrative institution with more than 800 staff members and a team of forest police in particular, which consists of 200 people taking the responsibility of forest protection. Therefore, a zero fire record has been gained in the last 30 years thanks to a well established fire controlling system in the reserve.

The reserve is proud of its ability to function as the base for scientific research, school experiments and public education. This is done by using the reserve's own facilities, such as the 2 000 square metres Changbaishan Natural Museum with 1 300 displayed specimens, sculptural models, pictures, materials and the journal "Nature Conservation in Changbaishan Mountain" to carry out information exchange and education for science popularisation. Only a few reserves in China are comparable to Changbaishan with regard to its museum and its journal.

The Sky Lake, located on the top of Changbaishan Mountain, is the largest and deepest volcanic lake in China with its water area of 9. 8 square kilometres and the maximum depth of 373 m. As clear as a green crystal, the lake is surrounded by 16 peaks of the fantastic irregularities and has a waterfall rushing down 68 m from its northern gap. What a marvellous scenery it is.

It is such a magnificent natural landscape that a

myriad of visitors have been attracted from at home and abroad. Alpine skiing especially makes the mountain a famous resort year round. The cultural scenic spots in and around the reserve are also the pride of the reserve. For example, ancient graves, monuments to the revolutionary martyrs, cave ruins of "Antu Men", stone – carved face, etc. are located here. There are no less than 100 natural and cultural scenic spots in the reserve including its periphery. The visitors number over 200 000 each year. Among those the tourists from the neighbouring country, e. g. R. Korea has been increasing in recent years. Actually ecotourism has become a pivotal industry of the reserve, which not only strengthens the reserve's economic power, but also boosts the economy of the surrounding areas, increasing their per capita income nine times during the last decade.

However, negative effects have resulted unavoidably from the rapid growth of tourism year by year. Whether the tourism resources can be used sustainably is thus problematic, if no effective timely measures are taken. Recently, the reserve has promulgated the "General Plan for the Development of Forest Tourism in Changbaishan" and brought it into line with the provincial plan. In addition, a special Bureau of Tourism has been set up under the framework of the reserve. Designing and planning have been completed for the scenic spots and the tour routes, in conjunction with the institution of a unified organization and administration.

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鼎湖山生物圈保护区
Dinghushan Biosphere Reserve

▲ 鼎湖山保护区季风常绿阔叶林外貌
Monsoon evergreen broadleaf forests in Dinghushan Reserve.

▶ 深山古寺——建于唐代的庆云寺
Qingyun Temple - an old temple in romote mountains built in the Tang Dynasty.

▲ 中、澳合作进行生态旅游问卷调查

Inquire-answer investigation on eco-tourism, carried out by Sino-Australian cooperation.

▲ “姻缘树” ——由木棉 (*Bombax malabaricum*) 和龙眼 (*Dimocarpus longan*) 组成，引来无数青年男女在此顶礼膜拜，祈求幸福美满的婚姻

"Tree of Conjugal Felicity"--composed by Common bombax (*Bombax malabaricum*) and Longan (*Dimocarpus longan*), worshipped by countless young men and women praying for a happy marriage.

▲ 中、美合作进行生物多样性监测研究

Monitoring research on biodiversity carried out by Sino-US cooperation.

鼎湖山生物圈保护区

地理位置：广东省肇庆市

面　　积：1 155hm^2

海　　拔：14.1～1 000.3m

保护对象：南亚热带季风常绿阔叶林森林生态系统及宗教文化历史

建区时间：1956 年

纳入联合国教科文组织世界生物圈保护区网络：1979 年

鼎湖山旅游示意图

Tourism Map of Dinghushan

被中外学者誉为“北回归线上的绿洲”的鼎湖山，是中国建立的第一个自然保护区和中国科学院建立最早的森林生态系统定位研究站之一，亦是中国首批纳入联合国教科文组织世界生物圈保护区网络的保护区之一，并成为南半球同纬度的澳大利亚昆士兰亚热带森林生态系统研究站的姐妹站。

鼎湖山生物圈保护区处于热带北缘和亚热带南缘。属季风湿润型气候，雨量充沛，夏秋高温多雨，冬无冰雪稍干旱。在这优越的自然条件下发育的以季风常绿阔叶林为主的森林植被，被人们称为南亚热带常绿阔叶林或亚热带雨林（也有学者称为亚热带常绿阔叶林向热带雨林的过渡类型）。区内有高等植物 2 500 余种，森林覆盖率达 78.7%，主要植被类型季风常绿阔叶林占森林总面积的 18%。林冠重叠稠密，层次结构复杂，有如观光木（*Tsoongiodendron odorum*）、格木（*Erythrophleum fordii*）、锥栗（*Castanopsis chinensis*）、橄榄（*Canarium album*）、黄桐（*Endospermum chinense*）、荷木（*Schima superba*）等高居林冠之上的大树，其树干高大通直，树基部多具扩展状板根；有特异生存能力的榕树（*Ficus* spp.），其种子依赖动物带到别的树枝丫上或树皮裂缝后，萌发生长，其垂吊而下的气生根一边伸向地面，一边将寄主绞杀致死而居于树冠之上；有茎如履带、粗达 20 多厘米的大藤本扁担藤（*Tetrastigma planicaule*）；有在老树干上直接开花结果的“茎花植物”；有居其它树干上附生的兰科（*Orchidaceae*）、天南星科（*Araceae*）、石松科（*Lycopodiaceae*）及蕨类植物，构成了树上有树，层次分明的特殊森林景观。此外，还有许多如沿河流沟谷分布的沟谷雨林、处于不同演替阶段的针阔混交林、常绿阔叶林、稀树灌丛和各种人工林，以及在低洼沼泽成片的泥炭藓等其它植被类型，与季风常绿阔叶林共同构成了鼎湖山丰富的植被类型的生态景观。

鼎湖山生物圈保护区具有中生代曾广泛分布而现在成为濒危种的木本厥类植物桫椤（*Alsophila spinulosa*）、为纪念我国植物学家钟观光教授而命名的特有种观光木、木材坚硬耐腐的格木等国家重点保护植物 22 种。各种经济用途的植物更是应有尽有，有优良用材树种 320 多种，药用植物千余种，园林绿化观赏植物 340 种，油脂植物 180 多种，还有含淀粉、芳香油、纤维、橡胶、蜜源等丰富的资源植物，真不愧为南粤资源植物的宝库。丰富多样的植物资源为动物的生存提供了栖息和繁衍环境，昆虫和鸟类的种类十分丰富，已鉴定的昆虫有 900 多种，鸟类 178 种，兽类 38 种，爬行类 20 多种。属国家保护的哺乳动物有苏门羚（*Capricornis sumatraensis argyrochaetes*）、穿山甲（*Manis pentadactyla aurita*）、小灵猫（*Viuerricula indica*）等 15 种，历史上还有华南虎（*Panthera tigris amoyensis*）的记载。

鼎湖山于1956年初建立鼎湖山树木园，同年又在此基础上建立自然保护区。1978年在区内建立森林生态系统定位研究站，实行园、区、站一体化的管理体制，至今40余年来，发挥了自然保护、科研监测、国际合作、教育培训及持续发展等多种功能。

作为中国科学院唯一的保护区，科学研究一直是保护区工作的重点。科技力量及其科研工作在全国自然保护区中居于前茅。区内建有标本馆、苗圃、气象站、植物资源及其森林生态系统长期监测永久样地，进行了系统、深入的定位研究，出版了一系列科研成果报告、论文和专著。鼎湖山保护区也是全国最早对外开放的多学科研究基地和窗口，1979年以前已有20多个国家的专家和友好人士前来考察和观光，此后国际学术交流与合作日趋频繁，先后与美国、德国和澳大利亚的13所大学和研究机构开展了国际合作，举办专题培训班，培养了一批科研骨干。近年来又建成了鼎湖山珍稀濒危植物园、华南杜鹃园、珍稀植物观赏园和竹园，这些专类园的建立不仅为种质资源的保存及珍稀濒危植物的迁地保护和研究提供了保障，而且也为科普教育和生态旅游提供了良好的教材和场所，被广东省生物学会定为“广东省青少年科技考察基地”。每年接待教学实习的大、中专学生400～500人次，寒暑假到鼎湖山参加生物冬令营和夏令营及培训的中、小学生、教师达300～600人次。

鼎湖山还是岭南四大佛教名山之一和驰名中外的旅游胜地，有着悠久的宗教文化历史。据记载，建于唐代的庆云寺(公元731年)，鼎盛时期的僧侣多达1 000人，誉满东南亚。目前鼎湖山仍是宗教活动的中心，每年到鼎湖山朝山拜佛和欣赏自然景观的游客达60万～80万人次，尤以港、澳、台和东南亚地区的游客为多。鼎湖山生物圈保护区已不仅仅是一个生物种质资源的保存基地，它对于自然保护、生态系统研究和维护生态平衡以及国际合作与交流、生态旅游、科普教育、培训和宗教文化活动等方面具有重要价值。

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Dinghu Shan Biosphere Reserve

Location: Zhaoqing City, Guangdong Province
Area: 1 155 hm^2
Altitude: 14.1～1000.3m
Main objectives for protection: monsoon evergreen broadleaf forest ecosystem of south subtropics
Established: 1956
National Nature Reserve desingation: 1956
UNESCO World Biosphere Reserve designation: 1979

Dinghushan, often accounted by world scientistsas "the Oasis in the Tropic of Cancer", is one of China's first nature reserves with the first permanent research station for forest ecosystem studies to be set up by the Chinese Academy of Sciences. It is also one out of the first Nature Reserves in China to be approved as a member of WBRN, and now is the Sister Research Station of Subtropical Forest Ecosystem of Queensland, Australia in the same latitude of the Southern Hemisphere.

The reserve is located at the north edge of tropics and the south edge of subtropics. The climate is a moist monsoon with high temperatures and rainfall in autumn and summer, and a slight drought without ice and snow in winter. This climate has created the monsoon evergreen broadleaf forest, also named the south subtropical evergreen broadleaf forest, or subtropical rain forest, which is considered by some scholars as a transition type between subtropical evergreen broadleaf forest and tropical rain forest.

This forest type is dominant, accounting for 18% of the area's forest coverage 78.7%.

The densely crowned forest has a complex and layered structure containing a lot of very interesting plants. The big and straight trees standing higher above the crown are Tsoong's tree (*Tsoongiodendron odorum*), Ford erythrophleum (*Erythrophleum fordii*), Chinese evergreen chinquapin (*Castanopsis chinensis*), white canary tree (*Canarium album*), Chinese endospermum (*Endospermum chinense*), schima (*Schima superba*), etc., and most of them have expanded buttresses. Some species of fig tree (*Ficus* spp.) have an unusual technique for survival, i.e. when

their seeds are disseminated by animals onto the crotches or bark of other trees the young plants have the ability to grow by air roots. These air roots wind downward against the host plant on their way to the ground. The host plant is thus strangled in the end. In consequence, these fig trees are called stranglers. The big flat – stem rock vine (*Tetrastigma planicaule*) attains a thickness of over 20 cm.. A number of trees have a unique way of flowering and fructifying, their flowers and fruits do not grow on newly sprouted twigs in the usual fashion but on the tough old tree trunk, scientists named this kind of tree as "cauliflory plant". Some of the interesting plants are epiphytic plants of the orchid (*Orchidaceae*), arum (*Araceae*) and lycopod (*Lycopodiaceae*) families and ferns as well. All those phenomena mentioned occur not as commonly as in the tropical rain forest, but they do contribute to the charm of the monsoon evergreen broadleaf forest. In addition, there are other types of vegetation communities, such as the ravine rain forestt, coniferous and broadleaf mixed forest, broadleaf forest, mountain shrubby grassland, various kinds of plantation forests and patches of mire, constiuting the colourful landscape of Dinghushan.

Of the 2 500 species of higher plants in the reserve, 22 are accorded national protection, among those are the endangered fern (*Alsophila spinulosa*) which used to have a wide distrbution in the Mesozoic Era, the endemic plant Tsoong's tree named after the Chinese botanist Zhong Guanguang, and the Ford erythrophleum.

Great diversity exists in economic plants including 320 species of elite timber – yielding plants, over 1 000 medicinal plants, 340 decorative plants, 180 oil plants and many others.

Of the species identified to date, there are 900 insects, 178 birds, 38 beasts and more than 20 reptiles. There are 15 species of national protected mammals, like mainland serow (*Capricornis sumatraensis argyrochaetes*), Chinese pangolin (*Manis pentadactyla aurita*) and small Indian civet (*Viuerricula indica*). The occurrence of South China tiger (*Panthera tigris amoyensis*) only has historic record.

With the Arboretum – Reserve – Station involved, the three – into – one administration framework has been adopted since 1978, when the Station was established. As a result, a framework of multiple functions has been created to address nature conservation, scientific research and monitoring, internattional cooperation, education and training and sustainable development. As the only reserve affiliated to the Chinese Academy of Sciences, the reserve emphasized the role of scientific research

from its very beginning. The research force and the research work are at the forefront of all reserves in China. The completed facilities contain herbarium, nursery, weatther posts and permanent plots for long term monitoring. A series of research programmes have been completed with many reports, papers and monographs issued.

Similarly, the reserve is the first in China to open to the outside world. It has received large numbers of visitors from more than 20 countries. Some 13 foreign universities and institutes have been involved in the international cooperation on scientific research and training. Some special gardens have been built in recent years, i. e. Dinghushan Garden for Rare and Endangered Plants, the South China Azalea Garden, the Viewing Garden for Rare and Precious Plants and the Bamboo Garden, which play an important role in not only the preservation of germplasm resources, *ex situ* conservation and the research of rare and endangered species, but also provide a good site with vivid and informative teaching materials for popular education and ecotourism. It was designated by Guangdong Biological Society as "Guangdong Provincial Base of Scientific Investigation for Yonug People" with 400 ~ 500 students visiting annually and another 300 ~ 600 students and teachers coming to join the activities of summer and winter campuses and training.

Dinghushan is one of the four noted Buddhism mountains in South of Qinling. It has a long history of religious culture attracting people to come and worship. For example, the Qingyun Temple built in AD 731 has held as many as 1 000 monks and nuns at its days of great prosperity. And now the reserve receives 600 000 ~ 800 000 pilgrims and other visitors each year. Most of them are from Hong Kong, Macao, Taiwan and Southeast Asia.

Evidently, the reserve has also, to a certain degree, played a role in local development. In particular, the reserve has attracted tourists to this area by providing the well protected natural environment, which is the sound basis for the development of ecotourism.

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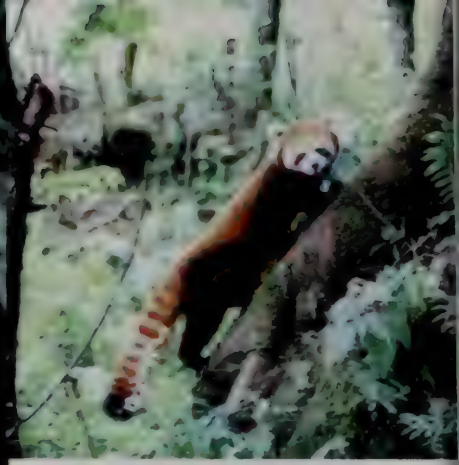
▲ 卧龙大熊猫研究中心
Wolong Giant Panda Research Center.

▶ 稀客——野生大熊猫到农家院觅食
Rare visitor--Wild giant panda *(Ailuropoda melanoleuca)* looking for food in farmer's backyard

▲ 大熊猫常规体检
Routine Physicae examination for Panda



▲ 小熊猫
Lesser panda *(Ailurus fulgens)*

▲ 大熊猫栖息地——箭竹 *(Sinarundinaria* spp.*)*、冷杉 *(Abies* sp.*)* 林
Chinacane, fir, habitats of Pandas

▼大熊猫与游客
Panda and tourists.

卧龙生物圈保护区

地理位置:四川省汶川县

面　　积:200 000hm^2

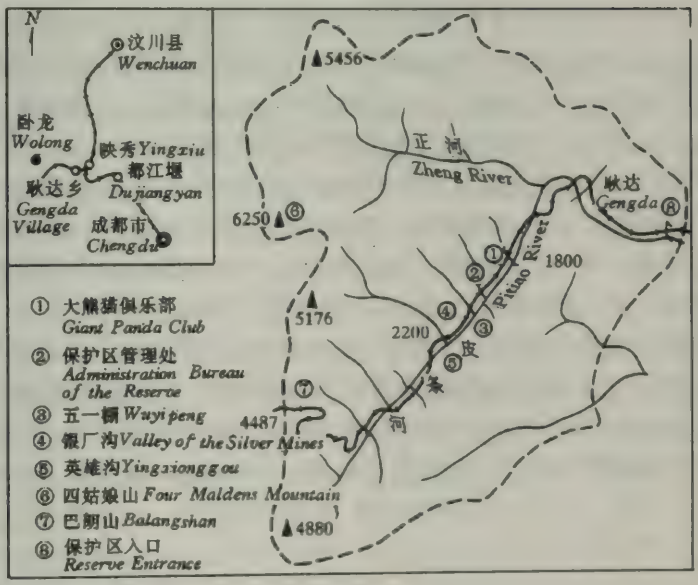
海　　拔:1 200～6 250m

保护对象:大熊猫等珍稀物种和山地森林生态系统

建区时间:1963 年

晋升国家级自然保护区:1975 年

纳入联合国教科文组织世界生物圈保护区网络:1979 年



卧龙旅游示意图

Tourism Map of Wolong

被誉为"熊猫之乡"的卧龙生物圈保护区,位于邛崃山脉的崇山峻岭之中,至今保持着古老的原始状态。在这片有终年积雪的山脉和古木参天的原始森林中,保存着深受世界瞩目的大熊猫(*Ailuropoda melanoleuca*)及众多珍稀物种。

卧龙,正像她的名字一样,地势由西北向东南倾斜,延绵山脉宛如一条横卧着的巨龙,形成了山峦起伏,河流纵横的地貌特征。境内3条主要河流都具有流程短、落差大、流速快,水力资源丰富的特点。本区气候属亚热带季风气候向青藏高原气候过渡型,水热条件的垂直分异,孕育了丰富的植物种类。分布着亚热带、温带、寒温带植物4 000余种,形成了完整的植被垂直带谱。有起源古老,形成超过600hm^{2}优势群落的珙桐(*Davidia involucrata*)及水青树(*Tetracentron sinense*)、连香树(*Cercidiphyllum japonicum* var. *sinense*)、四川红杉(*Larix mastersiana*)等国家重点保护的珍稀濒危植物24种。完整的生态系统和优越的自然条件,为各种鸟、兽、昆虫提供了良好的栖居繁衍条件。鸟类达281种,头羽似角身着绵袍的红腹角雉(*Tragopon temminckii*)、羽毛亮丽的藏马鸡(*Crossoptilon crossoptilon*)等。昆虫1 700余种。兽类103种,闻名遐尔的大熊猫以约百只左右的庞大种群成了这里的当然"主人",还有金丝猴(*Rhinopithecus roxellance*)、扭角羚(*Budorcas taxicolor*)、白唇鹿(*Cerus albirostris*)等57种国家一、二级保护动物出没其间。

大熊猫在更新世时曾十分兴盛。在距今约200万年前的第四纪,气候多次巨变,冰川数次扩张、退缩,北半球普遍降温,迫使生物群发生巨大的变化、演变和迁徙。我国四川、甘肃、陕西三省交界处的山谷,由于秦岭和大巴山阻隔了寒冷气流南下,大熊猫在这里找到了避难所,少数幸存者得到了生存、繁衍,这个动物界的"活化石"便被保存了下来。

大熊猫是我国的"国宝",也是大自然赐于全人类的共同财富。大熊猫作为中国人民的友好使者曾数次出访美国、日本等许多国家,深受世界人民喜爱。世界野生生物基金会(WWF)早在30多年前成立时,就以大熊猫形象作为会标,目前已成为全球自然保护的象征。

大熊猫在动物分类学上属食肉动物,远古时是一种矫健兽斗的猛兽,如今却主要以高山箭竹(*Sinarundinaria* sp.)为食,姿容也变得矫丽庄重,性情温顺憨厚。大熊猫居无定所的奇特习性和体格健壮的母体,所产幼仔仅约90g,形如小鼠,哺乳期丢失幼仔从不寻找的生理、生活特征和习性,激起了世界各国专家学者的研究热情。国内、外热心大熊猫保护的社会各界人士纷纷"认养"卧龙保护区人工饲养的大熊猫,促进了大熊猫的研究和保护工作。

卧龙生物圈保护区建立后,形成了有170多名专业技术人员的科研骨干队伍,组建了以大熊

猫保护和繁殖为重点的科研机构、兽医院、大熊猫繁殖场及大熊猫野外观察站。闻名的“五一棚”就是世界上第1个系统观察和研究大熊猫野外生活的科研基地。1980年,与WWF达成长期科研合作协议,建立了世界上第1个“中国保护大熊猫研究中心”。科研人员将无线电监测技术引进大熊猫研究,进行了大熊猫个体生态、种群生态、主食竹的动态监测研究,掌握了大熊猫繁殖生态的第一手资料,在此基础上开展了人工饲养、繁殖、育幼、疾病防治、行为生态等研究工作,取得了突破性的成就。1991年以来,连续6年共繁殖大熊猫11胎16仔,成活11仔,并创造了1只未食初乳、人工抚养幼仔成活160天的世界纪录。1995年又创冬季产仔的世界奇迹。

近年来,中国人与生物圈国家委员会组织有关国内、外专家对卧龙生物圈保护区进行了实地考察和评估,并引进了先进的地理信息系统技术进行保护区管理,有力地促进了保护区工作向更高水平发展。同时以自然博物馆、大熊猫俱乐部等宣教设施为基础,广泛开展科技夏令营等活动,已经成为向广大群众以及青少年进行科普教育的基地。

卧龙生物圈保护区蕴藏着巨大的资源潜力,利用丰富的水力资源先后修建电站7座,不仅解决了当地居民的能源问题,实现了以电代柴,保护了森林资源的目标,而且电力外输,年收入数千万元。地处四川省都江堰、九寨沟、黄龙寺等著名旅游环线上的卧龙生物圈保护区,更是国内外游人仰慕之地,多次接待外国元首、政府首脑、国际组织官员和国际会议。近年来卧龙保护区开辟了核桃坪、白龙沟、银厂沟、英雄沟、正河等旅游景点开展生态旅游,组织当地居民开展旅游服务,每年接待科学考察、教学实习、旅游度假的中外来宾3万余人。

卧龙生物圈保护区辖两个藏族乡,农业人口约5 000人,是中国唯一作为特别行政区管理的保护区,受林业部和四川省政府双重领导,具有地方县级政府和事业单位双重职能。实行特别行政区和自然保护区管理局合署办公的管理体制,统筹安排保护、科研和当地居民的生产生活,吸收部分居民直接参与保护工作并使之从中受益,形成了“以保护为核心,科研为重点,农、林、牧、企、旅游各业有机结合、协调发展”的格局。对“生物圈保护区塞维利亚纲要(Seville Strategy)”的实施迈出了可喜的一步。

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Wolong Biosphere Reserve

Location: Wenchuan County, Sichuan Province
Area: 200 000 hm^2
Altitude: 1 200～6 250 m
Main objectives for protection: alpine forest ecosystem with giant panda
Established: 1963
National Nature Reserve designation: 1975
UNESCO World Biosphere Reserve designation: 1979

Famous as the "Home to giant panda (*Ailuropoda melanoleuca*)", Wolong Biosphere Reserve lies in Qionglai mountain range, which enjoys the primeval forest with a lot of rare and precious species such as the "Chinese treasure", the giant panda.

As the terrain declines from northwest to southeast, the big mountain range looks like a lying giant dragon; the name Wolong (lying dragon in Chinese) is thus originated. All three rivers in the area are characterized by shortness, long drops, swiftness of flow and richness in water resource. The climate is characterised by the transition from the subtropical monsoon to the Qinghai – Xizang (Tibet) Plateau climate. Water and heat conditions are differentiated altitudinally, resulting in a complete vertical zonation of vegetation, which consists of more than 4 000 species of subtropical – temperate – cold and temperate zones. Among 24 rare and endangered species of the Nation's priority for protection are the Chinese dove – tree (*Davidia involucrata*), which dominates in a community covering an area of 600 hm^2, tetracentron (*Tetracentron sinense*) and Chinese katsuratree (*Cercidiphyllum japonicum* var. *sinense*), masters larch (*Larix mastersiana*).

The various natural environments distributed in the reserve are favorable to the diversity of animal life, too. There are 57 species of the first and second classes of national protected animals, including some 100 individuals of giant panda, golden monkey (*Rhinopithecus roxellance*), takin (*Budorcas taxicolor*) and Thorold's deer (*Cervus albirostris*). There are 281 species of birds such as crimson – bellied tragopan (*Tragopan temminckii*), white eared – pheasant (*Crossoptilon crossoptilon*) and 103 species of beasts in the

reserve. The insect species here amount to 1 700 or more.

Thanks to Qinling and Daba Mountains which prevent the cold current from flowing southward, giant panda, now less in number, has survived the violent meteorological changes of the Quaternary Glacial Period in this natural sanctuary – the valleys in the juncture of Sichuan, Gansu and Shanxi Provinces.

Giant panda belongs to carnivorous animals based on animal taxonomy, because it used to be a beast of prey thriving in the Pleistocene Era, but now it feeds on Chinacane, a kind of bamboo (*Sinarundinaria* sp.) Since the food source is a problem to this animal, the baby – panda is as small as mouse and often the mother panda loses its babies during the suckling period and never looks for them back, tremendous concern has been aroused worldwide to protect giant panda.

Since the founding of the reserve, the facilities with a team of 170 professional science and technology staff members have been built principally for the protection and breeding of giant panda. This includes the research agency, veterinary hospital, breeding farm and observatory plots. The "May 1st – Booth", established in the reserve, is the first field study base for giant panda in the world. The "China's Research Center for the Protection of Giant Panda" was established in 1980 on the basis of long – term cooperation with World Wide Fund for Nature (WWF). Encouraging progress has been made by using radio monitoring techniques, e.g., the autecology and the population ecology of panda and Chinese cane life cycle. Having had the first hand information on the reproductive ecology of panda, some breakthroughs have further been obtained in the studies of panda's artificial breeding, youngling feeding, disease control, etc. For example, 16 youngsters were born from 11 embryos in a six year time period since 1991; a world record was set for a purely artificially fed youngster living through 160 days, and the baby panda born in winter of 1995 was a marvel.

The reserve's work has been promoted vigorously after China MAB organized an international panel of specialists from home and abroad for field investigation and review of the reserve's management, and after the introduction of GIS technique into management. By making full use of the existing facilities, such as the nature museum and the Giant Panda Club, the reserve serves as a base of science popularization.

Affiliated to both the State's Ministry of Forestry and Sichuan Province, the reserve is one of few in China, which was designated as a Special

Administrative District within the Province. It has jurisdiction over two Tibetan Prefectures with an agriculture－based population of 5 000. A unified administrative authority combining the Special Administrative District with the reserve was formed to supervise the conservation, scientific research and the local people's livelihood, with conservation as key goal, scientific research as focal point of work, and agriculture, forestry, animal husbandry, sideline production and tourism integrated.

There exists an immense potential of natural resources in the reserve. So far as water resources are concerned, seven hydroelectric power stations have been constructed, which not only used electric power to replace fuel wood conducive to the protection of forest resources, but also won 30 million yuan annual income as a result of the transmission and sale of the excess electrical power to areas outside the reserve.

The reserve is located in the famous circled tour line of Dujiangyan － Jiuzhaigou － Huanglongsi, which is even more appealing to tourists. Among more than 30 000 visitors each year there is no lack of foreign heads of State, high－ranking officers of foreign governments and international organizations as well.

In recent years there have been additional five scenic spots newly opened, i. e., Hetaoping, Bailonggou, Yinchanggou, Yingxionggou and Zhenhe, which offer more opportunities for the local people to take part in the tourism services for financial benefits. No doubt, the future of the reserve is bright.

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梵净山生物圈保护区
Fanjingshan Biosphere Reserve

◀ 梵净山蘑菇石
Mushroom Rock in Fanjingshan.

▼ 可爱的小宝宝——第一只人工驯养条件下繁殖的黔金丝猴 *(Rhinopithecus roxellanae brelichi)* A lovely baby–the first Guizhou Golden Monkey *(Rhinopithecus roxellanae brelichi)* reproduced under domestication.

▲ 春天是花的海洋——杜鹃 *(Rhododendron* sp.*)*
Spring is bathing in a sea of flowers--Rosa bay *(Rhododendron* sp.*)*

▲国家一级保护珍稀动物——大鲵（娃娃鱼）*(Andrias davidianus)*
Giant newt *(Andrias davidianus)*--precious and rare animals under the first class national protection.

◀黔金丝猴驯养及繁殖技术研究
Research on domestication and reproduction technology of Guizhou Golden Monkey.

梵净山生物圈保护区

地理位置:贵州省江口、印江、松桃苗族自治县境内

面　　积:41 647hm^2

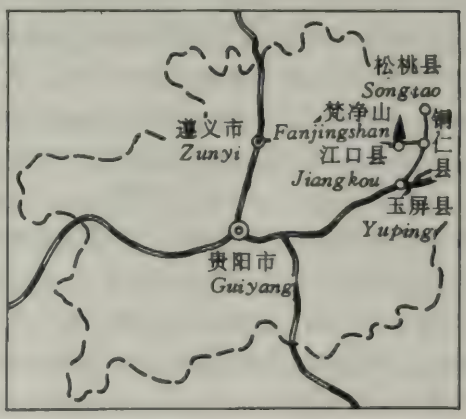
海　　拔:500～2 570.5m

保护对象:黔金丝猴、珙桐等珍稀动、植物和中亚热带原始森林生态系统

建区时间:1978 年

晋升国家级自然保护区:1986 年

纳入联合国教科文组织世界生物圈保护区网络:1986 年



梵净山旅游示意图

Tourism Map of Fanjingshan Mountain

矗立于云贵高原东部向湘西丘陵过渡带上的梵净山，是武陵山脉的主峰。其山体庞大，地势隆起显著，周围耸立着海拔2 000m以上的山峰20余座。奇峰峻峭，溪流纵横，飞暴悬泻，以及独特的天象奇观，给这里的山山水水增添了神秘的色彩。每当雨后天晴，在山峰空际间突然出现一道五彩缤纷的光环，有放大了数倍或数十倍的人影在其中晃动，被人们称为“吉祥佛光”，各地僧侣纷纷来此建寺。后因山上多梵宇，被人们视为梵天净地，故称梵净山。

梵净山地处我国亚热带中心，受东亚季风气候的控制，形成了温暖湿润的环境，成为我国亚热带东部湿润区保存完整、原生性强、垂直分异明显的森林生态系统。山地海拔高度的变化，导致气候、土壤、植被的垂直分异，构成梵净山完整的垂直带谱。从山麓到顶峰，依次分布着常绿阔叶林、常绿阔叶和落叶阔叶混交林、落叶阔叶林、高山针叶林、灌丛草甸等植被类型带。在漫长的地质岁月中，该区一直处于温暖湿润的气候条件下，成为多种动、植物保存和繁衍的场所，保存了大量第三、第四纪的古老物种。有维管束植物2 000余种，有中南、东南、和华南几个区系的主要动物300余种。特别是拥有中国特有的珍稀濒危孑遗植物珙桐（*Davidia involucrata*）群落，总面积达80hm^2，是当今世界上最集中的分布区。此外还有国家重点保护植物连香树（*Cercidiphyllum japonicum*）、梵净山冷杉（*Abies fanjingshanensis*）、红杉（*Larix mastersiana*）等21种。重点保护动物黔金丝猴（*Rhinopithecus roxellanea brelichi*）、华南虎（*Panthera tigris amoyensis*）、云豹（*Neofelis nebulosa*）、白颈长尾雉（*Syrmaticus ellioti*）、大鲵（*Andrias davidianus*）等19种。

梵净山是珍稀濒危动物黔金丝猴的世界唯一产地，它同大熊猫一样，都是第四纪的伴生动物。在梵净山附近发现了黔金丝猴化石，足以证明它是名副其实的“活化石”，目前仅存700只左右，是世界上最少的一种灵长类动物。除北京动物园短暂展出外，世界所有动物园都未展出过。能够亲眼目睹黔金丝猴尊容的人很少，直接观察到猴群野外生态活动的人更是寥寥无几。

梵净山保存的这些大量古老、稀有、原始的物种，对研究古生物、古气候及近代气候的变迁具有重要价值，激发了众多中、外科学家的探索研究欲望，梵净山已成为目前世界上唯一的黔金丝猴研究中心。保护区科研人员通过黔金丝猴的系统研究，基本掌握了其病理和生理状况，从而为它的繁衍提供了可靠依据，同时对灵长类动物的研究提供了基础资料，总结出了对灵长类动物的保护和管理经验。并首次人工繁育出4只黔金丝猴，填补了该项目的世界空白。保护区还在不同的垂直带谱上建立了森林定点观察站，系统地收集了亚热带山地森林效应和植被变化等各类数据，建起了完整的数据管理系统，为研究生物界在无干扰状况下的演变、更新及恢复亚热带地

区的自然生态系统的管理提供了科学依据。保护区科研人员在对本区进行了大量的研究，并取得重要科研成果的基础上，参加和承担了贵州省其他自然保护区的科学考察工作，强化了保护区的横向联系，促进了全省的自然保护事业。

梵净山保护区地处少数民族山区，区内有居民 1.5 万人。其中，土家族、苗族等少数民族占区内总人口的 81%。为达到自然保护与持续发展的目的，坚持以科研为基础，保护为中心，依靠当地政府，团结区内居民，全面发展的指导方针，通过广泛开展科普宣传，在保留部分传统知识基础上，引入新的生产方式，扶持当地居民开展多种经营，对合理利用药用植物资源、野生物种驯化等给予技术指导和示范，从而使当地居民走上致富之路，消除了保护与开发之间的矛盾。

近年来，随着旅游热潮的兴起，梵净山生物圈保护区根据保护与发展的需求进行了规划，设置了专门用于开展科研、培训、监测、生态旅游、宗教活动的教育和旅游小区，严格划定旅游路线，实施规范化管理，开展宣传教育，取得良好社会、生态和经济效益。梵净山自古以来为黔之名山，佛教圣地，在宗教文化历史上享有盛名。由于明清两朝宗教活动盛行，山上营建的寺庙甚多，在通往梵净山金顶的主要道路上，几乎 3 里一寺，5 里一庙，计 48 座。最著名的有承恩寺、镇国寺、护国寺等九大寺庙。但因几经沧桑，留下的尽是废墟遗址。尽管如此，梵净山仍是众多香客朝山拜佛之圣地，每逢宗教节日，远近朝山拜佛的善男信女络绎不绝，虔诚之至，其宗教文化影响深远，构成梵净山的一大人文景观。除此之外，梵净山的自然景观及其世界上绝无仅有的一些珍稀物种亦是众多海内、外游客仰慕之所在。当人们进入梵净山区，沿着 8 000 余级石梯盘曲而上，便可领略到她的自然风貌。自山颠倾泻而下的数道溪流，穿过乱石，飞越悬崖，流入深潭，至山下汇成九十九溪，这便是梵净山奇景之一“九龙池”。山巅有大小金顶，高约 80m，壁立如削。大金顶上有数十吨重的方形巨石，人称“万卷书崖”，一柱支撑，欲坠不坠，惊心动魄。丰富的旅游资源，是发展与保护梵净山的一只“金碗”，也是梵净山持续发展的“后盾”。

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Fanjing Shan Biosphere Reserve

Location: Miao Autonomous Counties of Jiangkou, Yinjiang and Songtao, Guizhou Province
Area: 41 647 hm^2
Altitude: 500～2 570.5 m
Main objectives for protection: Guizhou golden monkey, Chinese dove tree and the central subtropical forest ecosystem
Established: 1978
National Nature Reserve designation: 1986
UNESCO World Biosphere Reserve designation: 1986

Fanjingshan Mountain is the main peak of the Wuling mountain range, towering aloft among 20 surrounding peaks. It is the area where east Yunnan－Guizhou Plateau and west Hunan Hills meet. The landscape is endowed with mystery because of the peaks steep and grotesque, the valleys deep and quiet, immersed in the sea of cloud, the streams scattered here and there, the long dropping waterfalls and especially, the peculiar rainbow, or the so－called "Lucky light radiated from Buddhas", whichoccurs on the air among the peaks and looks like a coloured ring of light with considerably magnified human images moving within. Monks and nuns were attracted from various places to build temples there. Owing to the "Fan" (related to ancient Indian Buddhism) －style temples common there, people named the Mountain "Fanjingshan" which means a pure land of mortal.

Since it is situated in the center of subtropics of China, the Mountain is dominated by the southeast monsoon, and is the best preserved forest ecosystem in the moist area of China's east subtropics. Distributed from the foot to the top are: evergreen broadleaf forest, evergreen and deciduous broadleaf mixed forest, deciduous broadleaf forest, alpine coniferous forest and shrubby meadow. The area is warm and wet throughout geological changes. As a result, great numbers of the Tertiary and the Quaternary relic species have been preserved, among them over 2 000 vascular plants. An 80 ha expanse of Chinese dove tree (*Davidia involucrata*) community is particularly precious. Other 21 rare species of national protection include katsuratree (*Cercidiphyllum japonicum*), Fanjingshan fir (*Abies fanjingshanensis*) and mastesr larch (*Larix mastersiana*). There are 19 animal species listed as State's priorities for protection, e. g., Guizhou golden monkey (*Rhinopithecus roxellanea brelichi*), South China

tiger(*Panthera tigris amoyensis*), clouded leopard (*Neofelis nebulosa*), Elliot ' s pheasant (*Symaticus ellioti*) and giant newt (*Andrias davidianus*).

Fanjingshan is the only place in the world where Guizhou golden monkey lives. It is a relic of the Quaternary and a real "living fossil" at that, which has been proven by its fossil found near the Fanjingshan mountain. It only has a population of some 700. Being a primate with such a small population, it has never been exhibited in any zoo in the world except for the Beijing Zoo. Naturally, Fanjingshan Reserve became the only center for Guizhou golden monkey research. Through systematic studies on this animal the research workers of the reserve have gained a basic knowledge of its pathology and physiology, which is the premise of protection and management of the monkey and their primate relatives . Now the reserve has for the first time artificially bred four Guizhou golden monkeys.

In the reserve there are forest observation plots scattered on different vertical zones. A data system on the efficiency of subtropical mountain forest and vegetational succession has been created, which provides a scientific basis for the research on evolution, rehabilitation and recovery of natural ecosystems in subtropical areas under non-human disturbance conditions. Having had large amount of research work done with important results, the reserve' s research workers further take part in scientific investigations in other reserves within the Province. This reinforces the association between the reserve and other institutes and gives impetus to the cause of nature conservation in the whole province.

The reserve is among the areas inhabited by minority nationalities. It has 15 000 residents with the population of Tujia and Miao nationalities occupying 81 % of the total. Evidently to solve the contradiction between conservation and development is of vital importance in this area.

The religious culture has a good reputation from the remote past, as the mountain is a holy land for Buddhists. There are 48 temples and cloisters built mostly during the Ming and Qing Dynasties. That the devotees to Buddha come from various places to do worship during Buddhist festivals adds importance to the human landscape.

It goes without saying that the natural landscape is just beautiful. Wherever you stop on your way up through the more than 8 000 steps of the stone ladder, your eyes quickly feast on the scenery. For example, " Jiulongchi " (nine-dragon pond) receives numerous streams from the top of the

mountain, flowing and flying on the rocks and cliffs, and "Wanjuanshuya" is a huge square rock which lies on the sheer precipice making it look like a huge book. The rich tourism resources laid a sound foundation for the development as well as conservation of the reserve.

With the rising enthusiasm of tourism in the country, the reserve has completed the planning and establishment of various special districts for scientific research and monitoring, education and training, ecotourism and religious activities, respectively. The tour lines were designated strictly and corresponding administration based on roles and regulations has been pursued seriously. Together with improving public awareness, both good ecological and social – economical efficiency have been achieved.

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▲ 苍山翠竹——武夷山的毛竹 *(Phyllostachys pubescent)* 林

Green mountain covered by bamboo--forest of moso bamboo *(Phyllostachys pubescent)* in Wuyishan.

▶ 毛竹加工

Bamboo processing

▲ 武夷山自然博物馆
Natural Museum of Wuyishan

▲ 分布于海拔1700—2000 m以上的苔藓矮曲林
Bryophyte elfin forest distributed above 1700-2000 m a.s.l.

▼ 武夷山大竹岚断裂带
Fracture zone of Dazhulan in Wuyishan

▼ 国家一级保护珍稀鸟类——黄腹角雉 (*Tragopan caboti*)
Yellow-bellied tragopan (*Tragopan caboti*) precious and rare birds under the first class of national protection

武夷山生物圈保护区

地理位置：福建省武夷山市、建阳市、光泽县交界处

面　　积：56 527hm^2

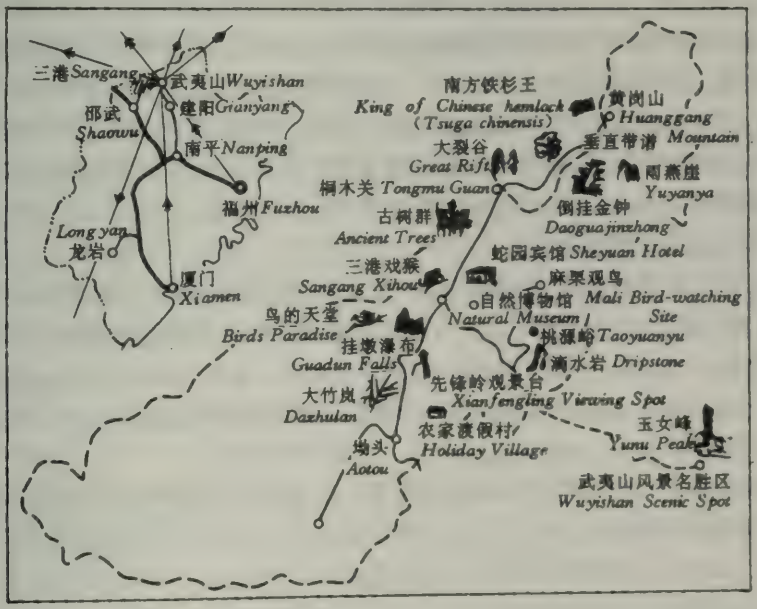
海　　拔：200～2 158m

保护对象：中亚热带森林生态系统及珍稀动、植物

建区时间：1979 年

晋升国家级自然保护区：1979 年

纳入联合国教科文组织世界生物圈保护区网络：1987 年



武夷山旅游示意图

Tourism Map of Wuyi Wountain

横亘千里，蜿蜒于闽、浙、赣三省边境的武夷山脉群峰耸翠，重峦叠嶂，享有“华东屋脊”之美誉。位于武夷山脉北麓的武夷山生物圈保护区，是中国东南大陆现存面积最大、保存最完整的中亚热带森林生态系统。

武夷山生物圈保护区山高坡陡，峡谷纵深，断裂显著，剥蚀明显，平均海拔 1 200m。区内有 1 500m 以上的山峰百余座，海拔 2 158m 的最高峰黄岗山，是东南大陆第一峰。巨大的山体组成了一道天然屏障，冬季阻拦和削弱了北方寒冷气流的入侵，夏季又抬升和截留了东南海洋季风。因而形成了气温低、降水多、气候垂直变化明显的特点。复杂的地形地貌，充足的水热条件，造就了武夷山保护区独特的自然环境和多种生态类型。由于本区没有受到第四纪冰川的侵袭，人为干扰也少，至今核心区内仍保留有 2 万余 hm^2 的原生性亚热带植被，除地带性植被常绿阔叶林占据海拔最低处至 1 400m 或 1 800 m 山体外，随海拔上升依次分布有针阔混交林、暖性针叶林、中山矮曲林和中山草甸等植被类型，森林覆盖率达 95.3%。植物区系处于泛北极植物区亚洲东部森林植物亚区的南缘，接近热带植物区印度——马来西亚北缘。因此，区内物种多样，地理成份复杂，过渡性明显，并具有起源古老，单型和少型科、属以及孑遗、珍稀物种多的特点。有高等植物 2 400 余种，低等植物 800 余种，其中列入国家重点保护的珍稀植物有南方红豆杉（*Taxus chinensis* var. *mairei*）、鹅掌楸（*Liriodendron chinense*）、钟萼木（*Bretschneidera sinensis*）、南方铁杉（*Tsuga chinensis* var. *tchekiangenes*）等 26 种。

武夷山保存完好的原始森林，为各种动物、昆虫的栖息繁衍提供了良好条件。据统计，区内有昆虫近 5 000 种，堪称“昆虫世界”，有野生脊椎动物 470 余种，鸟类 250 余种。其中属国家重点保护的有黄腹角雉（*Tragopan caboti*）、金猫（*Felis temmincki*）、黑麂（*Muntiacus crinifrons*）及中国特有种金斑喙凤蝶（*Teinopalpus aureus*）等 56 种。还有崇安髭蟾（*Vibrissaphora liui*）、崇安湍蛙（*Staurosis chunganensis*）、三港雨蛙（*Hyla sanchiangensis*）等一些本区特有种。

武夷山生物圈保护区是世界生物学家所瞩目的生物模式标本产地，同时也是科研、教育、监测、培训和生态旅游的理想场所，吸引了众多国内外科研工作者、学生以及热衷于探索大自然奥秘的人们。早在 1699 年，英国学者即进入武夷山保护区桐木关一带采集植物标本；1845 年后，英、法、美、德等国的传教士、学者都到此采集了大量动、植物标本。据统计，发现于武夷山的动、植物新种（含新亚种）达 1 000 多种，从已采集的昆虫标本中发表的武夷山昆虫新种就有 580 多种。在一个地方，生存着如此多的新种和稀有种，为世罕见。

武夷山保护区内居住着2 500多村民，这对保护区的管理是一个严峻的挑战。保护区管理局从保护与发展的实际需求出发，采取“局—所—哨卡”和“局—所—村”两线三级管理体制。成立了有周边县、市政府、有关单位及区内、外村民参加的联合保护委员会，实行社区共管，取得良好效果。为了解决好区内村民的生产和生活，积极引导和扶持村民合理利用自然资源，发展毛竹和茶叶生产及深加工，使区内村民收入比建区初期提高了10余倍，大大高于区外村民的收入。通过十多年的努力，武夷山保护区不仅增强了自身的经济实力和管理水平，同时促进了当地社区的经济发展，成为保护与发展协调一致的示范地之一。

武夷山生物圈保护区有健全的管理机构及较强的科研和管理队伍，同国内外科研单位及国际组织开展了一系列科学研究、国际合作交流活动，取得重要成果，培养了一批科研和管理人才。1995年，成为实施全球环境基金(GEF) 中国自然保护区管理项目的5个保护区之一。

武夷山是我国东南沿海名山之一，以其丰富的旅游资源赢得了“奇秀甲于东南”的美名，吸引了众多海内外学者和游客。这里的华东第一峰——黄岗山及其层次分明的植被垂直带谱；童话世界——中山矮曲林；山水交映的泥洋瀑布；清幽的桃源峪；竹的海洋——大竹岚等秀丽的自然景观，以及珍稀特有的动植物、昆虫世界、人文景观和内容丰富的自然博物馆，为科研、探险、教学、旅游观光等不同层次、不同需求的各界人士提供了良好条件。作为生物圈保护区，武夷山已经成为自然保护、科研、监测和教育、培训的基地。并在合理利用自然资源，开展生态旅游等方面显示出较大优势，目前每年接待游客已超过2万人次。随着生态旅游的发展，必将促进武夷山生物圈保护区自然保护与持续发展迈上新台阶。

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Wuyi Shan Biosphere Reserve

Location: Wuyi, Jianyang and Guangze Counties, Fujian Province
Area: 56 527 hm^2
Altitude: 200～2 158 m
Main objectives for protection: central subtropical forest ecosystem and its rare and precious species
Established: 1979
National Nature Reserve designation : 1979
UNESCO World Biosphere Reserve designation: 1987

Curving thousands of miles along the bordersof Fujian, Zhejiang and Jiangxi Provinces, there is a mountain range praised as "The Roof of East China" – the Wuyishan Mountain and at its northern part lies the Wuyishan Biosphere Reserve. High and steep the Mountain averages 1 200 m of elevation with its highest peak named Huanggangshan at 2 158 m, which is also the highest of China's southeast continent.

The massive mountain blocks or reduces the cold current from the north in the winter and lifts or cuts the monsoon from the southeast Pacific Ocean in summer, forming complicated climates. This climate is characterized by lower temperatures, abundant precipitation and distinct altitudinal variation. The area is suitable for a variety of ecological types due to the complex topography and adequate water and heat conditions.

Since this is an area unaffected by the Quaternary Glaciers and with much less human disturbance, 95.3% of the forest coverage has been maintained with some 20 000 hm^2 of original subtropical vegetation flourishing in the core area of the Biosphere Reserve. The evergreen broadleaf forest on the mountain, being the zonal vegetation, is distributed at altitudes between 1 400～1 800 m. With the increase in elevation, it is substituted in sequence by coniferous and broadleaf mixed forest, temperate coniferous forest, mid-mountain elfin woodland and mid－mountain meadow.

Floristically, it belongs to the southern edge of the East Asia Forest Subregion in the Pan Arctic Region, which is close to the northern edge of the Tropical India－Malaysia Region. Therefore, there are immense numbers of plant species. The composition of the flora can be reduced to the

following characteristics: high diversity, complexity in geographical elements, markedness in transitional properties, origin in antiquity, richness in monomorphic genera and families, oligomorphic genera and families as well as rare and relic species. In the reserve there are more than 2 400 species of higher plants and more than 800 species of lower plants. Of which 26 were listed as species of national protection are maire yew (*Taxus chinensis* var. *mairei*), Chinese tuliptree (*Liriodendron chinense*), Chinese bretschneidera (*Bretschneidera sinensis*) and Chinese hemlock (*Tsuga chinensis* var. *tchekiangenes*) etc.

The well-preserved primeval forest of the Mountain provides good habitats supporting animal life. The reserve holds 470 species of vertebrates and more than 250 species of birds. The presence of 5 000 species of insects may well rate the mountain "The Kingdom of Insects". Among the animal species a total of 56 have been accorded the State priority for protection, e. g., Fukien tragopan (*Tragopan caboti*), golden cat (*Felis temmincki*), black muntjac (*Muntiacus crinifrons*) and the State's endemic species, a kind of butterfly (*Teinopalpus aureus*) as well as the Mountain's endemic species, a kind of horned toad (*Vibrissaphora liui*), two kinds of frags (*Staurosis chunganensis*) and *Hyla sanchiangensis*. In Consequence, the reserve is also famous for the production of biotic type specimens in the world. In 1699 the British scientist collected plants around Tongmuguan of the reserve area. Since 1845 the missionaries and scientists from England, France, USA and Germany have collected large numbers of animals and plants. It is estimated that the new species (including varieties) of animals and plants discovered in Wuyi Mountain account to over 1 000, and more than 580 new species of insects were published, which is a rare record in the world.

The 2 500 villagers or more living in the reserve pose a serious challenge to its management. The administration with two parallel hierarchies has been implemented with a reserve office-departments-sentry posts and the reserve office-departments-villages. A Committee of Joint Protection has been established to practise the participatory management, which is composed of representatives from the surrounding local governments, some related agencies and villagers in and out of the reserve.

In order to effectively solve the problems of the local people's livelihood, the reserve gave them guidance and help to properly use the natural resources, i. e., developing the production of bamboo and tea and their further processing. As a result, the villagers' income has been raised to

over 10 times that at the beginning of the founding of the reserve.

Wuyishan Biosphere Reserve boasts its sound administrative structure and rather strong team forces in scientific research and management. Important achievements have been gained through wide ranging cooperations with scientific organizations both at home and abroad, meanwhile the reserve's professional workers on research or management have been reaching maturity. That the reserve became one out of five of China's Nature Reserves which were selected for a Global Environment Facility (GEF) project in 1995 is a good illustration.

The fascination of Wuyishan Mountain's landscape exists everywhere, no matter where one's eyes are cast. It is one of the famous mountains in China's southeast coast. You can climb the highest peak, Huanggangshan, to see the vertical zonation of vegetation, enter the mid-mountain elfin woodland to experience the sense of fairy-tale world, sit by the Niyang waterfall to breathe the clean and moist air, go to the peaceful peach valley, Taoyuanyu, or enjoy the beautiful bamboo forest, Dazhulan. In fact, Wuyishan Biosphere Reserve has not only become a base for nature conservation, scientific research, monitoring and education through years of effort, but also has shown superiority in the development of ecotourism. The rich tourist resources won the reserve the reputation of "the most beautiful place in southeast China", attracting large numbers of visitors from at home and abroad. The 20 000 visitors per year received by the reserve gives reason to anticipate that ecotourism will promote the reserve's conservation and sustainable development as well.

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锡林郭勒生物圈保护区
Xilingol Biosphere Reserve

▲ 美丽的锡林河畔
Beautiful riverside of the Xilin River.

◀ 草原上的野生黄羊 *(Procapra gutturosa)*
Wild *Procapra gutturosa* on grassland.

▲ 中、澳姊妹生物圈保护区合作研究
Cooperative research between Sino-Australian Sister Biosphere Reserves.

▲ “他来了……”
“He is coming……”

▲ 迁居——逐水草而居的蒙古民族
Moving--the Mongolians seeking for water and grass.

锡林郭勒草原生物圈保护区

地理位置：内蒙古锡林郭勒盟锡林浩特市境内

面　　积：1 078 600hm^2

海　　拔：950～1 500m

保护对象：草原生态系统及野生濒危动、植物

建区时间：1985 年

晋升国家级自然保护区：1996 年

纳入联合国教科文组织世界生物圈保护区网络：1987 年

锡林郭勒旅游示意图

Tourism Map of Xilingol

位于内蒙古高原东南部锡林河流域的锡林郭勒草原生物圈保护区，是中国建立的第一个具有典型性和代表性的草地类自然保护区。她至今保留着完整的草原自然景观，构成了我国北方一道天然绿色生态屏障。

该区地处欧亚大陆温带草原区的东南部，气候具温带、半干旱大陆性特点，四季分明，降水适中。植物区系地理成份较复杂，以组成蒙古草原植被主体的达乌里——蒙古种、蒙古种、亚洲中部种比例最高，其次为黑海——哈萨克斯坦种和哈萨克斯坦——蒙古种、古地中海种等，反映了欧亚大陆草原植被的统一性。锡林河流域的上游靠近大兴安岭南部山地和小腾格里沙地，因此为北方山地森林种和东亚森林种的渗透提供了条件，许多种例如：夏绿灌木虎榛子（*Ostryopsis davidiana*）、常绿乔木白扦云杉（*Picea meyeri*）和油松（*Pinus tabulaeformis*）等中国及华北特有种向蒙古高原分布，并成为分布区的西部与北部边界，对认识亚洲东部植物区系的相互渗透关系是一个关键的地域。区内有种子植物 650 余种，苔藓 70 余种，菌类 40 余种。

保护区内野生动物区系反映了蒙古高原草原生物群落的一般特征，同时也保持着一定的区域特殊性。有兽类狼（*Canis lupus*）、赤狐（*Vulpes vulpes*）、伶鼬（*Mustela nivalis*）及黄羊（*Procarpa gutturose*）等 33 种，共同构成了区系组成的主要部分。区内还有鸟类 70 余种及数量众多的昆虫。

该区地带性草原植被广泛发育，并伴有沙地疏林、灌丛、河漫滩草甸、沼泽类型分布，形成有规律的结合格局，生物多样性显著提高，构成丰富的草地资源，为发展畜牧业创造了优越条件。

建区后，锡林郭勒保护区进行了本底调查与规划，将区内具代表性的生态系统及其珍稀、残遗、濒危植物分布区划定为：低山丘陵草甸草原、平原典型草原、以及沙地岛状分布的残遗白扦云杉林及山杨、白桦林等 4 个核心区，进行严格保护和管理。他们充分利用 1979 年在区内建立的中国科学院内蒙古草原生态系统定位研究站和高等院校的科学技术依托力量，合作开展了大量科研示范项目，取得一系列研究成果，为建设和合理利用草原自然资源提供了科学依据。例如，在过渡区建立了优化草地畜牧业持续发展示范区，通过示范研究，探索出科学、合理、易为当地群众接受的草地管理模式，根据区内资源的特点，引导当地群众合理利用草地资源发展畜牧业，有效地促进了草地资源的保护和畜牧业的发展。

保护区内还设有永久性观察样地、实验示范牧场、实验林场、科研监测中心、植物标本室、展厅、实验室等基础设施，已经成为科研、监测、教育和培训的基地，接待了众多国内外专家学者和学生来此科研和教学实习。近年来，国际合作与交流活动日益频繁，先后接待了来自美国、澳大

利亚、奥地利、英国、加拿大、法国、德国、意大利、日本、蒙古、新西兰、俄罗斯、瑞典等十几个国家的70余位草地专家和科学工作者来本区访问考察、科技合作和学术交流。自1995年该保护区与澳大利亚的普克马克(Bookmark)生物圈保护区结成"姊妹保护区"以来,开展了一系列互访考察、人员培训、信息交流和合作研究活动,促进了两个保护区之间的国际合作与交流。同时,带动了两个保护区所在的地区之间在商贸、教育、文化艺术、农牧业生产管理技术、生态旅游、人员培训等多方面国际合作与交流,促进了地区的经济发展。

天苍苍,野茫茫,风吹草低见牛羊……。这首美丽动听的草原赞歌,正是锡林郭勒大草原的真实写照,她那迷人的自然风光和浓郁的蒙古族民族风情令人神往。锡林郭勒草原生物圈保护区已经建成具有民族特色的草原旅游渡假村,热情好客的蒙古族人民迎来一批批科学考察、避暑休闲、旅游观光的海内外客人。座落在扎格斯太诺尔湖边的蒙古包及蒙古族人民的传统文化更为草原增添了魅力。随着草原自然植物园、草原野生动物园及科教活动中心等设施的建成,锡林郭勒草原将更加璀灿辉煌。

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Xilingol Grassland Biosphere Reserve

Location: Xilinhaote City, Xilingol League, Inner Mongolia
Area: 1 078 600 hm^2
Altitude: 900～1 500 m
Main objectives for protection: grassland ecosystem and endangered wild plants and animals
Established: 1985
National Nature Reserve designation: 1996
UNESCO World Biosphere Reserve designation: 1987

Located in the basin of Xilin River in thesoutheastpart of the Mongolian Plateau, the Xilingol Biosphere Reserve is China's first Nature Reserve with typical grassland. The grassland landscape has been completely preserved, which constitutes a natural green barrier of the ecological environment of North China. It has the characteristics of temperate and semi – arid continental climate with distinct four seasons and moderate precipitation resulting from its geographical position in the southeast part of the Eurasia Temperate Grassland Region.

The flora is complicated in geographical elements, dominated by Dawuli – Mongolian species, Kazakhstan – Mongolian species and Palae – mediterranean species, which reflects the integration of Eurasia grassland vegetation.

Flowing near the southern part of the mountain land of Daxinganling and the sand land of Xiaotenggeli, the upper reach of the Xilin River provides an inter – penetration medium between northern mountain forest species and East Asia forest species. This can be shown by the distribution of many endemic species to China and North China, e. g., David ostryopsis (*Ostryopsis davidiana*), Meyer spruce (*Picea meyeri*) and Chinese pine (*Pinus tabulaeformis*) extending into Mongolian Plateau, which has become the western and northern boarders of their distributional areas. The Mongolian Plateau is thus a key area on which a clear understanding of the inter – penetration relationship within the East Asia flora is based. The reserve holds 650 species and more of seed plants, over 70 species of bryophytes and around 40 species of fungi.

The fauna in the reserve shares the general features of grassland biotic community of Mongolian Plateau on one hand and possesses some regional peculiarities on the other. Thirty three species make up the principal elements, such as wolf (*Canis lupus*), fox (*Vulpes vulpes*), weasel (*Mustela nivalis*) and Mongolian gazella (*Procarpa gutturose*). There are over 70 species of birds and numerous species of insects.

The zonal grassland – vegetation develops well with other types of vegetation associations such as the open forest sand land, scrub, flood plain meadow and marsh. They form a regular pattern of combinations and thus heighten the level of biodiversity leading to advantageous conditions for animal husbandry. After it was founded, the reserve carried out the background investigation and planning with four core areas designated according to their typical ecosystems and their rare and endangered species, i. e., the hill meadow steppe, the typical steppe, the spruce forest isolated on the sand dune, and the birch and poplar forests isolated on the sand dune . These core areas are strictly protected and managed.

Large amount of scientific research work including some demonstration projects have been conducted by fully using the task force both from the Grassland Ecosystem Research Station of the Chinese Academy of Sciences and from the colleges and universities. A series of results supply people with a scientific basis to establish and rationally use the natural resources of the grassland. For example, a demonstration area for sustainable development was initiated in the buffer zone in an attempt to achieve an appropriate grassland management model for local herders through demonstration research. This has been proven to be an effective way to further the protection of grassland resources and enhance animal husbandry as well. In addition, the reserve established the permanent observation plots, demonstration pasture, experimental forest farm, research and monitoring center, herbarium, exhibition hall and laboratories.

The rather perfect infrastructure makes the reserve a base for research monitoring and training with many visiting scholars and students from China and other countries. With the increasing rise of international cooperation in recent years, more than 70 foreign grassland experts and research workers have visited here. They came from Australia, Austria, UK, Canada, France, Germany, Italy, Japan, Mongolia, New Zealand, Russia and Sweden. Since a sister – relationship with Bookmark Biosphere Reserve of Australia was developed in 1996, a series of activities have been carried out between the two sister reserves, such as

exchange visits, training and information sharing. The results are far beyond expectation, which not only reinforced the cooperative relationship between the two, but also promoted exchange and collaboration between the two regions in which the two Reserves are located. This included trade, education, culture and arts, managerial techniques of agriculture and animal husbandry, ecotourism and personnel training.

"The sky is so blue,
The grassland is so vast;
The sheep white and the cattle yellow
when the wind blows....."

The beautiful song of praise is a true portrait of the Xilingol grassland. The enchanting place and the special culture of the Mongolian minority nationality intrigue outsiders so much. A holiday village for grassland tours has been built and a yurt camped by the Zhagesitai Lake to provide additional charm to the grassland. Surely the reserve will be even more prosperous when the Grassland Garden, Grassland Zoo and other facilities like the Research and Education Center are completed.

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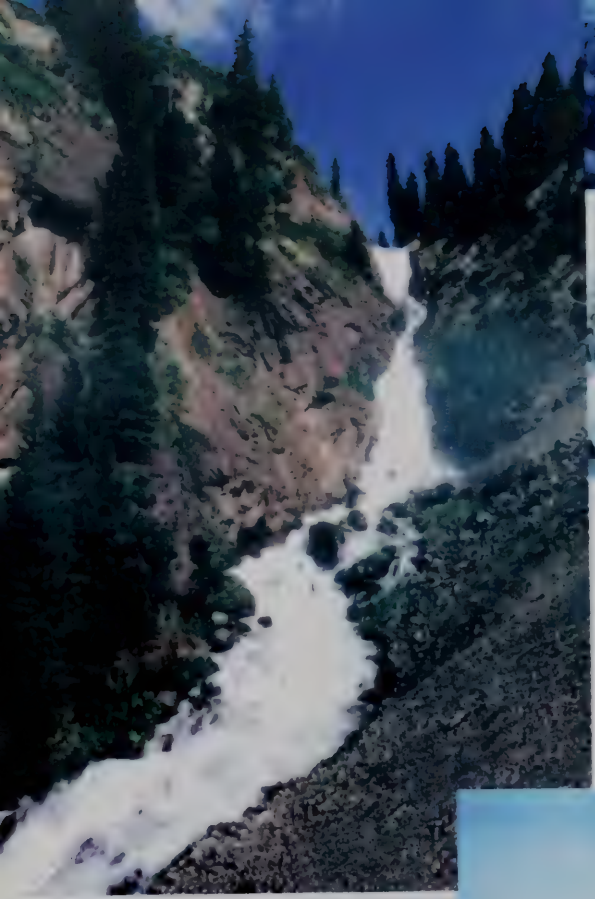
博格达生物圈保护区
Bogeda Biosphere Reserve

◀ 天山雪莲 (*Saussurea involucrata*)
Snow lotus (*Saussurea involucrata*) of Tianshan

▶ 天池风景旅游区
Scenic area of Sky Lake.



▲ 小天池飞瀑
Flying waterfall of Small Sky Lake.

▲ 银装素裹
Silver-dressed

▶半荒漠生态系统中的梭梭*(Haloxylon ammodendron)*林
Saxoul *(Haloxylon ammodendron)* woodland in semi-desert ecosystem.

博格达生物圈保护区

地理位置:新疆维吾尔自治区阜康市

面　　积:217 000hm^2

海　　拔:440～5 445m

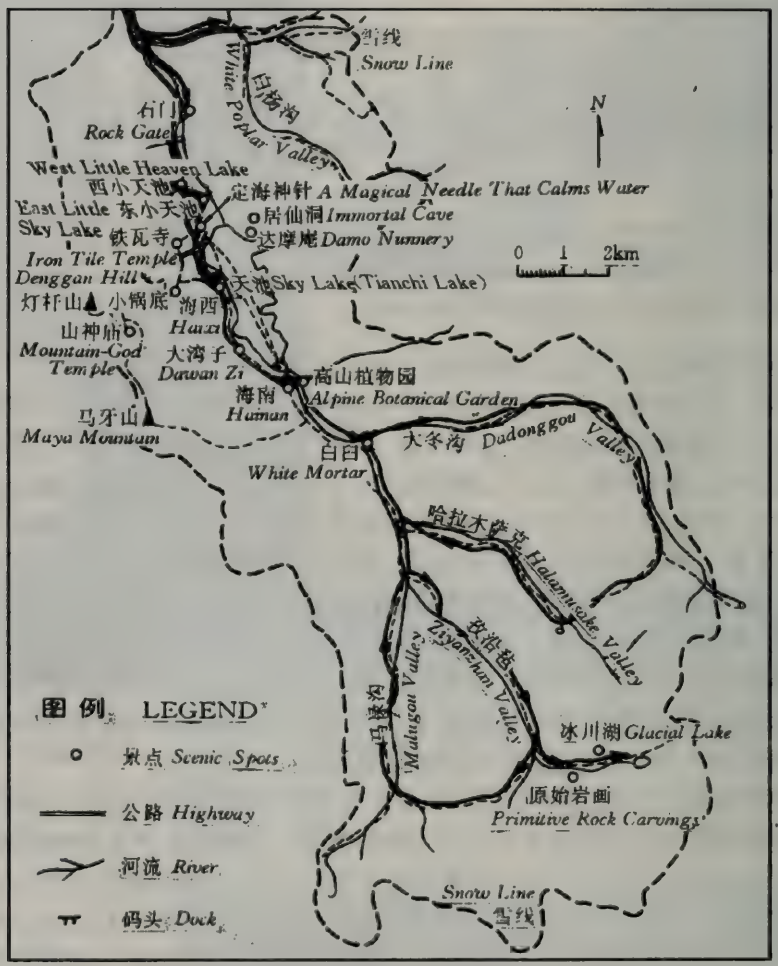
保护对象:中国温带内陆干旱区典型荒漠生态系统及自然景观

建区时间:1980 年

纳入联合国教科文组织世界生物圈保护区网络:1990 年

千年冰峰,银装素裹,湖光山色,相映成趣。地理位置独特,地貌类型复杂,自然景观带谱完整,生态系统多样。这,就是位于天山东部支脉——博格达峰北麓的博格达生物圈保护区所特有的自然风貌。该区位居欧亚大陆腹地,远离海洋,气候干旱,属温带荒漠气候。夏季炎热,冬季寒冷,年平均气温 6.6℃,最高气温 42.6℃,最低气温 -41.6℃。年平均降水量 164 mm,年平均蒸发量 2 000 mm 左右。然而,由于巨大的高差且面迎湿润西风大气环流,而成为新疆干旱区生态作用十分重大的"湿岛",域内具高山、亚高山、丘陵、洪积扇、冲积平原、固定和半固定沙丘等多种地貌类型。从高山至平原的巨大高差以及热量与降水的负相关分布,形成了天山东部最为完整的垂直自然景观带:高山、亚高山草甸生态系统、温带针叶林森林生态系统、温带草原生态系统、荒漠生态系统及绿洲农田等丰富多样的生态系统。加之亚高山湖泊——天池及垦区人工湿地的点缀,在南北长仅 80km,东西宽约 20km 的地域内,几乎包罗了亚洲中部大多数自然景观类型,成为研究荒漠生态系统及环境要素生态递变规律的理想场所。

这里动植物种类不算丰富,其区系组成却具有古老性、复杂性和独特性。该地区生物为古北界准噶尔——哈萨克斯坦省荒漠及复合山地生物群落型。动物区系为古北界蒙新区西部荒漠天山山地亚区,有脊椎动物约 160 种,其中属国家重点保护的一、二级动物有雪豹(*Panthera uncia*)、北山羊(*Capra sibirica*)、棕熊(*Ursus arctos*)、马鹿(*Cervus elaphus*)、鹅喉羚(*Gazella subgutturosa*)、赛加羚羊(*Saiga tatarica*)、黑鹳(*Ciconia nigra*)、小鸨(*Otis tetrax orientalis*)、暗腹雪鸡(*Tetraogallus himalayensis*)等 25 种。植物区系为亚洲荒漠区亚洲中部西区温带荒漠带。有植物近 700 种,其中属国家重点保护的有胡杨(*Populus diversifolia*)、梭梭(*Haloxylon ammoderdron*)、白梭梭(*H. persicum*)、肉苁蓉(*Cistanche salsa*)、雪莲(*Saussurea involucrata*)等。



博格达旅游示意图

Tourism Map of Bogeda

博格达生物圈保护区的核心区由以天池自然景观为中心及周边山地云杉林为主的自然生态系统和原始梭梭林荒漠生态系统两部分组成。境内有众多现代冰川、大小湖泊及森林和草原，对本区涵养水源、农业灌溉、防止沙漠化具有重要意义。然而，该类生态系统十分脆弱，一旦天池这一高山湖泊生态系统遭到破坏，湖水变干，水源消失，其他子系统乃至整个荒漠绿洲生态将遭到破坏。梭梭林荒漠生态系统如果遭到破坏，沙漠南侵，与此相接的农田生态系统维持不久就将消失。因此，加强科学研究、监测，采取有效措施保护好这些生态系统及其珍贵的自然资源，是该保护区肩负的重任。保护区建立后，同周边社区协调合作，制定了管理规划，使这一特殊的自然本底及其自然资源得到了有效保护。本区内还建有中国科学院阜康荒漠生态系统观测试验站、三工河流域水均衡观测场、平原草场改良试验站、气象观测站、试验林场及野马驯养中心等科研监测站、点，中外科研单位合作开展了一系列综合科学考察及试验示范和长期监测研究，为保护区及其周围社区的管理、规划和发展提供了科学依据。

镶嵌在天山之巅的博格达峰下的天池，古称“瑶池”。她是由于冰川作用形成的高山湖泊，面积 2.45km^2，平均深度 60m 以上，最深处达 100m 以上。周围还有定海神针、摹岩石刻、居仙洞群及寺观遗址等人文景观，同这里的雪山、冰川、森林、草地、高山湖泊和当地哈萨克民族风情相融合，构成了集自然景观、科学价值和人文景观于一身的生态旅游胜地。这里早期曾为禁猎、禁伐的道教圣地，仅有牧道与外界相通，野生动物相当繁盛。自 50 年代易牧道为公路，80 年代辟为国家风景旅游区后，旅游活动日趋频繁，每年到此旅游、考察的国内外游客和科学家达 30 余万人次。

旅游业的发展，给当地群众带来了利益，促进了社区经济和保护区自身的发展。同时，也造成环境污染和野生动物减少等负面影响。博格达生物圈保护区通过广泛开展宣传教育，划定专门的旅游景点和路线范围，加强了自然本底的保护与旅游管理的协调，取得良好效果。随着该生物圈保护区对其特殊的荒漠自然生态系统的保护、科研监测、教育、示范及自然资源持续利用等多功能的充分发挥，必将为人类的生存和社会经济发展做出应有的贡献。

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Bogeda Biosphere Reserve

Location: Fukang County, Xinjiang Uygur Autonomous Region
Area: 217 000 hm^2
Altitude: 440～5 445 m
Main objectives for protection: typical desert ecosystem and its landscape of China's inland arid land in temperate zone
Established: 1980
UNESCO World Biosphere Reserve designation: 1990

Featured by a peculiar geographical location, complex landforms, complete vertical landscape zonation and multiple ecosystems, the Bogeda Biosphere Reserve is located in the north side of Bogeda Peak, the eastern branch of the Tianshan Mountain range. Being in the middle of Eurasia, far away from the sea, it has temperate desert climate with hot summers and cold winters, the highest temperature measures 42.6℃ and lowest −41.6℃, the average annual temperature 6.6℃, the average annual precipitation 164 mm and the average annual evaporation 2 000 mm. However, the drastic elevation difference and the moist west wind drift received by Bogeda Peak make it a special "wet island" in Xinjiang arid areas. Various kinds of landforms can be found in the reserve, i.e., alpine, subalpine, hill, diluvial fan, alluvial plain, fixed and unfixed sand dune. The vertical landscape zonation, which is most complete in the eastern Tianshan Mountain corresponding to the colourful ecosystems, occur in relation to the different heat and water conditions, namely, alpine and subalpine meadow ecosystem, temperate coniferous forest ecosystem, temperate grassland ecosystem, desert ecosystem and green farm land oasis ecosystem. Additionally decorated with a subalpine lake-Sky Lake, and an artificial wetland, an area only 80 km in length and 20 km in width displays almost the majority of natural landscapes in Central Asia. Endowed with the charm of delightful contrast between ice and snow and greenness of plant life, it is a desirable place to study desert ecosystems and the ecological changes of evironmental elements in different gradients.

In spite of the low species diversity, the reserve's floristic and faunistic compositions possess the characteristics of antiquity, uniqueness and complexity.

Biogeographically, it belongs to the Desert and Complex Mountain Biota of Palaearctic Zhungeer – Kazakhstan Province. In terms of fauna it belongs to the Subarea of Desert Tianshan Mountainous Land of Western Mongolia – Xinjiang Area of Palaearctic Group. The reserve holds 160 species of vertebrates, of which 25 species are the first and the second classes of national protection, e. g., snow leopard (*Panthera uncia*), ibex (*Capra sibirica*), black stork (*Ciconia nigra*), little bustard(*Otis tetrax orientalis*), brown bear (*Ursus arctos*), red deer(*Cervus elaphus*), goitred gazelle (*Gazella subgutturosa*), saiga(*Saiga tatarica*) and snowcock (*Tetraogallus himalayensis*). Its flora belongs to Temperate Desert of Western Part of Central Asia of Asian Desert Region. There are 700 plant species in the reserve, of which the national protection species include diversifolious poplar (*Populus diversifolia*), saxoul (*Haloxylon ammodendron*), Persican saxoul (*Haloxylon persicum*), saline cistanche(*Cistanche salsa*) and snow lotus(*Saussurea involucrata*).

Sky Lake and its surrounding spruce(*Picea*) forest and primeval saxoul woodland – desert ecosystems make up the reserve's core area. There are many contemporary glaciers, lakes, forests and grasslands in the reserve, which are of vital importance to water conservation, irrigation and desert prevention of the area and beyond. Also they are fragile ecosystems; as soon as the alpine lake ecosystem is destroyed, the lake will drain, other sub – ecosystems and even the whole desert – oasis ecosystem will be destroyed too. If the saxoul wood land – desert ecosystem is in disturbance, the desert will extend southwards and the farmland ecosystem will disappear. In view of this, the reserve has a key commitment to intensify scientific research and monitoring and to take effective measures to protect the ecosystems and their natural resources. Since it was established, the reserve has completed the management planning in cooperation with the local communities and has begun implementing the plan. The facilities of the reserve have provided a scientific basis to its management, planning and development as well as to those of the periphery communities. These include the observatory and Experimental Station for the Fukang Desert Ecosystem established by the Chinese Academy of Sciences, the water balance monitoring site for the Sangong River Valley, the alpine meadow amelioration experimental station, the meteorological observatory, the experimental forest farm and the wild horse domestication center.

Interspersed within Bogeda Peak, Sky Lake, named "Yaochi" in ancient times, is a beautiful alpine glacial lake with an area of 2. 45 square kilometers and 60 m in depth. Its maximum depth reaches 100 m or more. In the surrounding areas,

there are many cultural scenic spots such as Dinghaishenzhen, Muyan Carved Stone, Immortal Living Caves and the ruins of temples. Since the 1950s the mountain paths have been reconstructed into highways. The area has been designated as national scenic area since the 1980s and tourism developed with 300 000 scientists and other visitors each year. Tourism provides opportunities of development with benefits for local people. However the negative results of environmental pollution and decreased wild life appear. The reserve takes education to improve public awareness as an important solution. Now, special spots and routes for tourism have been defined so as to enhance the coordination between protection and tourism management and good results have been achieved. Further contributions will certainly be made to the human survival and social economic development, when the reserve takes fully implementaion of its multiple function in the protection research, monitoring, education, demonstration and sustainable use of natural resources of desert ecosystem.

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神农架生物圈保护区
Shennongjia Biosphere Reserve

▲ 神农架南天门石林旅游景区一角

A corner of scenery spot of Nantianmen Stone Forest in Shennongjia

▲ 传说中“野人”出没的地方

The place where "wild men" appeared in legend

▲ 被誉为中国鸽子树的珍稀植物—珙桐（*Davidia involucrata*）

Davidia involucrata – a precious and rare plant known as Chinese dove tree.

▲ 千年铁坚杉 *(Tsuga chinensis* var.*tchekiangensis)*

A thousand-year-old Chinese hemlock

▲ 中国特有的珍稀动物——金丝猴 *(Rhinopithecus roxellanae)*A precious and rare animal in China only--*(Rhinopithecus roxellanae)*

神农架生物圈保护区

地理位置:湖北省房县、兴山、巴东县境内

面　　积:70 000 hm^2

海　　拔:398～3 105.4m

保护对象:亚热带森林生态系统和金丝猴、珙桐等珍稀物种

建区时间: 1983 年

晋升国家级自然保护区:1986 年

纳入联合国教科文组织世界生物圈保护区网络:1990 年

神农架旅游示意图

Tourism Map of Shennongjia

在华中地区有一片原始森林，这就是传说中有“野人”出没的地方——神农架。神农架是中国西部高山区向东部丘陵平原区的过渡区域，地处北亚热带气候向温带气候过渡带。有“华中第一峰”之称的神农顶是这里的主峰。区内山高谷深，云山茫茫，地势险峻。气候上明显的垂直和水平差异及多种特殊气候类型的存在，造成了植物区系地理成分复杂，自然植被垂直分布规律和南北过渡特征十分明显。植物区系处于东亚两大区系：即中国——日本分布和中国——喜马拉雅分布的关键地区。加之历史上受第四纪冰川期影响甚微，使得该区成为华中山地唯一保存着大片原始森林的区域，同时又是中国东、南、西、北动、植物区系的荟萃地，汇集了大量特有和古老孑遗植物。在古树参天、人迹罕至的林海中，生长着 2 700 余种维管束植物及 900 余种真菌、地衣。有高达四、五十米的巴山冷杉（*Abies fargesii*），以及中国特有植物“中国鸽子树”珙桐（*Davidia involucrata*）、连香树（*Cercidiphyllum japonicum*）、水青树（*Tetracentron sinense*）、杜仲（*Eucommia ulmoides*）、鹅掌楸（*Liriodendron chinense*）等国家重点保护植物 34 种。素享“天然药园”之誉的神农架，野生药用植物达 1 800 余种，以其种类多，产量大，珍贵稀有而驰名中外。相传远古时代，炎帝神农曾在此搭架上山采药因此而得名。神农架至今还保留着众多与神农采药有关的地名、遗址和传说。

茂密的森林和幽深的山谷，给野生动物的繁衍生息创造了极为有利的条件。动物区系成分以东洋界种类居多，有由东洋界逐步向古北界过渡的趋势。从中国动物地理区系来看，兼具南、北两方的成分，以东洋种的南方种占优势。从 19 世纪开始，不断有中外学者来神农架进行生物调查。据初步调查这里有野生动物约 400 种，其中有中国特有的一级珍稀、濒危动物金丝猴（*Rhinopithecus roxellanae*）、华南虎（*Panthera tigris amoyensis*）、林麝（*Moschus berezovskii*）、白冠长尾雉（*Sylmeticus reevesii*）等国家重点保护的野生动物 54 种。

已经成为生物多样性基础研究的理想基地的神农架，其古老的传说，几百年来关于“神农架有野人出没”的争论，以及白熊、白獐、白色苏门羚（*Capricornis* sp.）、白麝（*Moschus* sp.）、白云豹（*Neofelis* sp.）、白猴、白蛇等动物白化现象，更使神农架披上了神秘的面纱，吸引着众多科学家和海内外游客。

神农架，因其保存完好的原始森林生态系统成为华中地区的一道天然屏障，对整个长江中、下游的生态平衡极具现实意义，亦是研究生物多样性及植被自然演替规律、开展公众生态教育的理想场所。因而，将“神农架林区”作为县级行政区，以加强对神农架原始森林的保护和管理，是

中国仅有的少数几个特例之一。

神农架保护区所具有的特殊科研价值，已经成为科研人员和大专院校学生考察研究和实习的基地。保护区还依托于区内、外的中国科学院等国内许多科研单位的研究站、考察站等科研力量，并与之合作，进行了资源本底调查、金丝猴生态习性、繁殖生态研究和监测，重要资源植物研究，以及地理信息系统用于管理工作的研究。近年又作为世界银行“全球环境基金(GEF) 项目”在中国的示范点之一。

地处偏远贫困山区的神农架，区内还有居民 8 000 余人，在保护好原始森林及其野生动物的同时，扶持当地群众发展经济，是神农架保护区肩负的重任。保护区在管理上采取了特殊措施，将农村扶贫工作纳入保护区管理计划，设立了农村工作科，在地方政府的支持下，给区内居民以免税等经济优惠和扶持政策。吸收区内居民参与保护区防护等劳务工作，为他们提供就业的机会。并提供一定的资金扶持区内居民发展生态农业和庭园经济，种植药材、经济林，并给予技术指导。帮助居民建立了药园基地，引种栽培杜仲、厚朴（*Magnolia officinalis*）、神农香菊（*Dendranthema indicum* var. *aromatica*）、绞股蓝（*Gynostemma pentaphyllum*）、三尖杉（*Cephalotaxus fortunei*）、粗榧（*Torreya* sp.）、刺栗（*Castanea* sp.）等名贵中药材，使当地群众达到脱贫致富，成为生物圈保护区实现保护与持续发展协调的一种探索。

完善的管理机构和严格的管理制度，以及 1995 年由中国人与生物圈国家委员会组织的专家组进行的实地考察评估，进一步促进了神农架生物圈保护区多功能的发挥，在抓好保护管理的同时，给当地群众带来了通讯、交通、医疗、卫生、照明用电等多方面的方便和利益，得到当地群众的支持，自觉参与义务防护工作。

神农架生物圈保护区旅游资源的开发，蕴藏着巨大潜力。丰富的旅游资源以及邻近长江三峡旅游热线的区位优势，吸引着众多海内外科学工作者和观光游客。开展生态旅游，是神农架保护区自身发展和推动当地社区经济发展的支柱产业，湖北省已将神农架纳入地方旅游发展规划，目前已开辟了鸭子口、神农顶、猴子石、观音洞等旅游小区。1996 年 5 月，湖北省政府在神农架生物圈保护区组织了“’96 中国湖北度假休闲游暨神农架国际旅游首游式”，来自中国、日本、新加坡、加拿大、美国等十多个国家和地区的旅行社及游客 1 000 多人参加了首游式，并将被救护的部分野生动物放归大自然，提醒人们在欣赏自然美景的同时更要爱护自然，保护环境。此次活动，为神农架生物圈保护区开展生态旅游拉开了序幕，它将以其特有的风韵来迎接五洲四海的

朋友。

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Shennongjia Biosphere Reserve

Location: Fangxian, Xingshan and Badong Counties of Hubei Province
Area: 70 000 hm^2
Altitude: 398～3 105.4m
Main objectives for protection: subtropical forest ecosystem and rare species such as golden monkey and Chinese dove tree
Established: 1983
National Nature Reserve designation: 1986
UNESCO World Biosphere Reserve designation: 1990

A rare primeval forest named Shennongjia stretchesin Central China, where it is said to be mysterious because of the unpredictable appearance and disappearance of the unidentified "wild men". Since the Quaternary glacial period had little influence on the area, Shennongjia is the only primeval forest in central China to survive. It is located in the transitional area both topographically from China's western high mountains to eastern hills and plains, and climatically from the north subtropics to the temperate zone. There is also a dramatic difference in elevation with the main peak, Shennongding or "the highest in Central China", at 3 105.4 m and the lowest valley at 398 m. These variations result in a flora that is not only complex in geographical elements, but also characteristic of both altitudinal and south－north transitional distribuation. Furthermore, it is comparable with the two major floras of East Asia, i.e., Sino－Japan and Sino－Himalaya. As a result, there is a large number of endemic and relic species among its 2 700 species of vascular plants and more than 900 species of fungi and lichens. Thirty four species were accorded status as State priorities for protection, e.g., Farges Fir (*Abies fargesii*) which is 40～50 m high, the Chinese dove tree (*Davidia involucrata*), katsuratree (*Cercidiphyllun japonicum* var. *sinense*), tetracentron (*Tetracentron sinense*), eucommia (*Eucommia ulmoides*) and Chinese tulip tree (*Liriodendron chinense*). Shennongjia, renowned as the "Natural Garden of Medicinal Plants", enjoys more than 1 800 species of medicinal plants.

The dense forest and the deep valleys are favorite habitats for various wildlife. The elements of fauna shows influences by the Oriental region and the Palaearctic region, with the former in the majority. With respect to China's fauna, the reserve has

mixed elements from the south and the north with a predominance of southern species. On record, there are 400 species of wild animals in the area, among those 54 have been listed as the State priorities for protection. For example, the endemics of China: golden monkey (*Rhinopithecus roxellanae*), South China tiger (*Panthera tigris amoyensis*), musk deer (*Moschus berezovskii*) and reeves's pheasant (*Sylmeticus reevesii*).

The mysteriousness underlying the untraversed forest with many ancient trees reaching into the skies, the "wild men" and the albinism of animals such as mainland serow (*Capricornis* sp.), musk deer (*Moschus* sp.), and clouded leopard (*Neofelis* sp.), the so called white bear, white snake and white monkey, has attracted scientists and other visitors from at home and aborad.

Shennongjia functions as a natural wall of Central China, influencing the ecological environment of the middle and lower reaches of the Yangtze River. It is for these peculiarities that "Shennongjia forest area" was among the few cases in China designated as a county – level administrative district in order to enhance the protection and management of the primeval forest.

Heavy investments have been made in terms of scientific research in this region by many institutes mainly those of the Chinese Academy of Sciences. This includes investigations into the natural resources of the area in general, the ecological behaviour of the golden monkey and some important plant resources and the GIS application for management in particular. Recently Shennongjia was selected as a Chinese pilot location for a Global Environment Facility (GEF) project of the World Bank.

As there are more than 8 000 residents in this area, the reserve must commit itself to help them release themselves from poverty. Consequently, a lot of measures have been taken to include the "Help the Poor" project in the reserve's management plan. Fox example, a special Rural Section was established, which gives the residents economic preferences such as exemption from taxation, opportunities for employment and financial support to enable them to develop eco – agriculture, home – garden, medicinal plant cultivation and economic tree planting. The base for medicinal gardening has been created for the purpose of introducing some precious traditional Chinese medicinal plants, e. g., eucommia, officinal magnolia (*Magnolia officinalis*), Indian dendranthema (*Dendranthema indicum* var. *aromatica*), five – leaf gynostemma (*Gynostemma pentaphyllum*), fortune plum yew (*Cephalotaxus fortunei*), torreyya (*Torreya* sp.) and chestnut

(*Castanea* sp.). Infact, this has become an efficient way to help these remote and poor local people become well – off, which is also an approach to reconciling conservation and development in the Biosphere Reserves.

Having sound administrative arrangements and rigorous enforcement of rules and regulations in place, the reserve welcomed the experts from China – MAB for a Biosphere Reserve Review in 1995.

Immense potential for the development of ecotourism exists in the reserve owing to the rich tourism resource and the advantageous location neighbouring the popular line of the Yangtze River Three Gorges Tour. Ecotourism is considered as the pivotal industry to develop the reserve itself as well as to promote the local economy. The area has been put into line with the local plan for tourism of Hubei Province. At present the small districts of Yazikou, Shennongding, Houzishi and Guanyindong have been specially opened. In May of 1996, the provincial authorities organized an "Inauguration of the First International Holiday Tour to Hubei with Shennongjia in China" in the reserve. More than 1 000 visitors came from over 10 countries including USA, Canada, Singapore and Japan. Some rescued wild animals were released into nature at the event so as to raise the public awareness regarding love for nature and environmental protection.

These developments mentioned above in turn accelerate the multiple functions of Shennongjia Biosphere Reserve, which has won the local people's support and participation in the management of the reserve.

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盐城生物圈保护区
Yancheng Biosphere Reserve

▲ 晨鹤 *(Grus japonensis)*

Red-crowned Cranes *(Grus japonensis)* in Morning

▲ 倩影

The sweet couple

▲ 越冬鹤在滩涂

Over wintering cranes at beach

▲ 白枕鹤

White-naped cranes *(Grus vipio)*

▲ 鹤与人和谐相处

Harmony between man and cranes

盐城生物圈保护区

地理位置:江苏省东台、大丰、射阳、滨海、响水县境内

面　　积:453 000hm^2

海　　拔:1.3～3m

保护对象:丹顶鹤及其沿海滩涂湿地生态系统

建区时间:1984 年

晋升国家级自然保护区:1992 年

纳入联合国教科文组织世界生物圈保护区网络:1992 年

盐城生物圈保护区地处江淮下游,黄海之滨,海岸线全长 582km。区内滩涂宽阔,发育有广阔而典型的淤泥质潮滩,近海有特殊的潮波系统和潮流特征以及辐射状海底沙脊群,从而形成丰富的自然资源。生态学家誉这里为"世界上最大的海涂湿地型自然保护区之一",是世界珍禽丹顶鹤(*Grus japonensis*)数量最多的越冬地,经济学家称这里为"黄金海岸"。

该区由于受季风气候控制,处于暖温带与亚热带过渡地带,并受海洋性和大陆性气候影响,形成光照充足,无霜期长,降水丰沛,雨热同季等气候特点。广阔的滩涂、湿地、芦苇(*Phragmites communis*)沼泽为各种水禽、鸟类提供了丰富的食物来源和繁衍条件,使盐城保护区成为丹顶鹤、雁鸭类等水禽的主要越冬地和百鸟乐园。区内有鸟类 300 余种,其中有国家一、二级保护珍禽丹顶鹤、白鹳(*Ciconia ciconia*)、中华秋沙鸭(*Mergus squamatus*)、天鹅(*Cygnus cygnus*)、白琵鹭(*Platalea leucorodia*)、黑采琵鹭(*Platalea minor*)等 42 种。尤以丹顶鹤越冬数量高达 1 000 余只,最大集群近 500 只;雁鸭类达百余万只,最大集群 50 000 余只;黑嘴鸥(*Larus saundersi*)不仅有千余只的庞大种群在这里繁殖,而且有近 500 只在此过冬。另有数量众多的游禽、涉禽和少数雀形目鸟类。还有国家二级保护的稀有动物河麂(*Hydropotes inermis*)2 000 余头。

盐城生物圈保护区有健全的管理机构,在保护、科研、教育、培训、国际合作等方面同国内外有关单位开展了广泛的合作,尤其在应用新技术地理信息系统(GIS)管理、丹顶鹤驯养繁殖、河麂生态、黑嘴鸥繁殖生态、鸵鸟养殖、恢复湿地、招引越冬鸟类等方面取得了较为满意的结果。近年

来，接待了来自美国、日本、法国、港、澳、台等30多个国家和地区的专家、学者和游人，提高了盐城保护区在国内外的知名度。

盐城保护区内特种生物资源丰富，依照“加强资源保护，积极驯养繁殖，合理开发利用”的方针，在自我发展方面积极探索，积累了成功经验，成为集管护、科研、宣传、教育、培训和种植、养殖、生态旅游等多种经营于一体，全面规划，合理布局，引导周边群众有计划地利用区内生物资源，帮助他们发展水禽养殖，并提供种禽、种蛋、疫病防治和技术指导等义务服务，促进了自身和周边经济的发展。近期又完成了生态旅游和鸵鸟（*Struthio camelus camelus*）致富工程规划，利用已有的丹顶鹤驯养繁殖场、鸵鸟养殖场和即将建设实施的孔雀林、鹿园等开展生态旅游，带动当地千家万户发展鸵鸟养殖，共同致富。它将促进盐城生物圈保护区充分发挥其珍稀物种保护、科研、教育、培训基地的功能和生态旅游等多种经营的持续发展功能。

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Yancheng Biosphere Reserve

Location: Counties of Dongtai, Dafeng, Sheyang, Binhai and Xiangshui in Jiangsu Province
Area: 453 000 hm^2
Altitude: 1.3~3 m
Main objectives for protection: red-crowned crane and its coastal wetland ecosystem
Established: 1984
National Nature Reserve designation: 1992
UNESCO World Biosphere Reserve designation 1992

Yancheng Biosphere Reserve is situated in thelower reaches of the Yangtze and Huaihe Rivers on the coast of the Yellow Sea. Along its 582 km coast line the wide sea beach is a typical tidal mud flat with many natural resources. It is praised by ecologists as "One of the largest Nature Reserves of sea beach wetland in the world" and by economists as the "Golden beach". It is the most important habitat for the rare bird, the red-crowned crane (*Grus japonensis*).

The prevailing climate is the monsoon, therefore the area is in transition where warm temperate zone and subtropics meet. Additionally, it is heavily influenced by maritime climate. The area is full of sunlight, receives plenty of rainfall and has a long frost free period and a rainy season with higher temperatures.

The extensive beach, wetland and reed (*Phragmites communis*) marsh provide rich food sources and breeding habitats for water birds and other birds, which amount to more than 300 species. There are 42 species of rare birds under national protection, including red-crowned crane, white stork (*Ciconia ciconia*), Chinese merganser (*Mergus squamatus*), swan (*Cygnus cygnus*), white spoonbill (*Platalea leucorodia*) and black-faced spoonbill (*Platalea minor*). More than 1 000 individuals of red-crowned crane wintering there are in overwhelming majority among the reserve's total wintering bird population. Their largest group sometimes consists of 500 individuals. There are over 1 million wild geese stopping over at the reserve in groups as large as 50 000 individuals and more. The breeding population of Saunder's gull (*Larus saunderis*) reaches over 1 000 and their wintering individuals number some 500. Also there are large numbers of natatorial birds and wading birds. Other Passerines are in the minority. In addition, the reserve holds about 2 000 head of Chinese water deer (*Hydropotes inermis*), which is

the rare animal of the second class of national protection.

Yancheng Biosphere Reserve is well – instituted. A broad range of cooperative projects have been established between the reserve and other domestic and foreign institutes regarding various aspects of protection, scientific research, education and training. Satisfactory results have been obtained especially in such fields as the GIS application to management, domestication of red – crowned crane, ecology of Chinese water deer, behavior ecology of Saunder's gull's breeding, ostrich raising, wetland recovery and attracting wintering birds. Scientists, experts and other visitors have come from more than 30 countries and territories including USA, Japan, France, Macao and Taiwan, which has improved the reserve's reputation both in and out of the country.

Through years of tremendous effort, using the guideline of "Reinforcing the protection of natural resources, actively carrying out domesticating and breeding of important wildlife, properly tapping and using the resources", the reserve has accumulated many successful experiences in becoming financially self – sustaining. Now the reserve is multiple · functioning with conservation, management, scientific research, public awareness, education and training, cultivation, breeding and ecotourism. After completing science – based planning and proper land use designing, the reserve provided advice to the local people on how to use biological resources in accordance with the plan. The reserve helped them develop water fowl raising farms by voluntarily providing parent birds, eggs for parent birds, disease control and technical guidance. Recently the project "Becoming well – off via ecotourism and ostrich (*Struthio camelus camelus*) raising" was established. This is elucidated as this: ecotourism is to be developed by using the existing red – crowned crane breeding farm and ostrich breeding farm as well as the planned forest land for peacock and the planned deer garden, so as to mobilize the local residents to carry out ostrich breeding and reach the goal of everyone becoming well – off. It is a promising project which will effectively promote the multiple functions of the reserve and further the harmonization between man and nature in the future.

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◀ 西双版纳热带雨林外貌

A physiognomy of tropical rainforest in Xishuangbanna

▶ 西双版纳保护区内的野生亚洲象 (*Elephas maximus*) 群

Wild elephant group (*Elephas maximus*) in Xishuangbanna Reserve.

▲ 热带雨林中的绞杀现象
Strangler in tropical rainforest.

▲ 闲暇的傣族少女
Dai girls in leisure

▲ 傣族村寨 Villages of Dai nationality

▲ 独木成林——榕树 *(Ficus* sp.*)*
One tree growing into a forest--Fig-tree

西双版纳生物圈保护区

地理位置:云南省西双版纳州景洪、勐腊、勐海县境内

面　　积:241 776hm^2

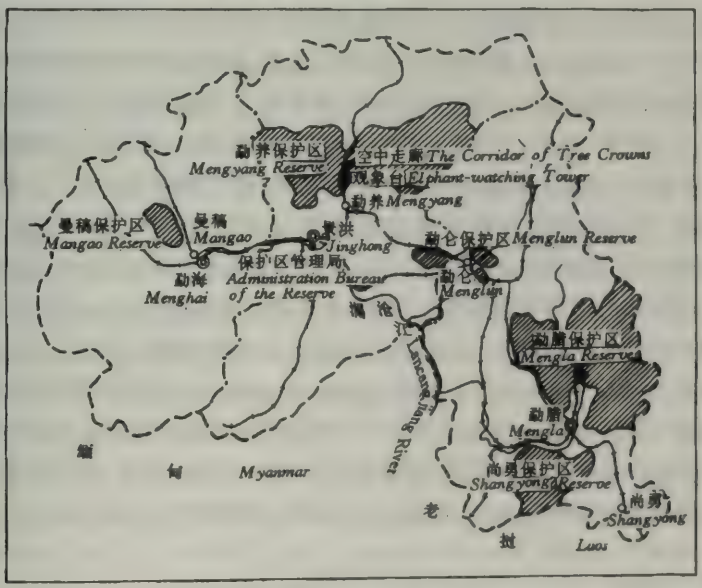
海　　拔:477～2 429m

保护对象:原始热带森林生态系统和野生亚洲大象等珍稀物种

建区时间:1958 年

晋升国家级自然保护区:1986 年

纳入联合国教科文组织世界生物圈保护区网络:1994 年



西双版纳旅游示意图

Tourism Map of Xishuangbanna

素有“自然多样性和文化多样性共存的热带之乡”美誉的西双版纳生物圈保护区，正像她的名字那样美丽、神秘。在西双版纳群山丛林中，生存着丰富多彩的热带、亚热带动、植物资源，同时也居住着十多个民族的居民，他们与老挝、缅甸、泰国、越南等周边国家的居民有着相似的文化、宗教和语言，更以其迷人的自然景观和民族文化享誉海内外。

西双版纳地处横断山脉南延余脉上，地势渐趋平缓，地形东、西、北三面较高，澜沧江及其支流网布纵横，山地、丘陵、河谷和盆地交错，深深影响着这里的气候等自然条件。这里气候属北热带季风气候，但因地处亚洲内陆向中南半岛过渡的地带北回归线以南，分别受来自太平洋和印度洋季风的影响，北有哀牢山和无量山脉阻挡冷空气南侵，所以冬季积温较同纬度地区高，夏季降雨较同纬度地区多，年平均降雨量 1 850mm。

由于地理和气候原因，该保护区成了中国保存面积最大、热带森林生态系统保存较完整的热带雨林地区。位于世界两大生物多样性关键地区的过渡地带，动、植物区系复杂多样。植物种类南北交汇渗透，东西混杂叠置，新老并存，森林生态系统及生物资源丰富而独异。区内的热带雨林既有东南亚雨林的典型特征，又明显具有过渡性和季节性的特色。在热带雨林中，绞杀植物、板根、老茎生花、巨大藤萝、热带花卉和白蚁洞穴等热带景观十分常见。森林植被类型有热带雨林、热带季雨林、亚热带常绿阔叶林、苔藓常绿阔叶林、落叶阔叶林等 8 个植被类型，已发现有 4 000余种高等植物，其中列为国家重点保护的植物 56 种。植物区系中含有较多古老属及单型属和寡型属、残遗植物，珍稀濒危种类达 343 种，其中有桫椤（*Cyathea spinulosa*）、大叶木兰（*Magnolia henryi*）等古热带孑遗植物 35 种；滇木莲（*Manglietia wangii*）、望天树（*Parashorea chinensis*）等特有种 153 种；四数木（*Tetrameles nudiflora*）、版纳青梅（*Vatica xishuangbannaensis*）等稀有种 134 种；野生稻（*Oryza meyeniana*）、砂仁（*Amomum villosum*）等栽培植物野生近缘种 28 种。

西双版纳还是中国野生珍稀动物汇萃区和中国蛇类的分布中心。珍稀、濒危种多，新记录、特有种比例大。有各种动物 2 100 余种，其中哺乳动物 102 种、鸟类 427 种、昆虫 1 437 种。被列为国家重点保护的有亚洲象（*Elephas maximus*）、白颊长臂猿（*Hylobatos oncolor lencogenys*）、印支虎（*Panthera tigris corbeffi*）、熊狸（*Arctictis binturong*）、印支野牛（*Bos gaurus readci*）、绿孔雀（*Pavo muticus imperator*）、孔雀雉（*Polylectron bicalcaratum*）等 36 种。

西双版纳居住着傣、汉、哈尼、拉祜、彝、基诺、布朗、瑶、克木人等十多个民族，有着多彩的民族文化。其文化、宗教、语言、建筑、饮食、服饰、节日、甚至地名都带有特别的地方风情。据记载，

傣族人民在西双版纳地区已经居住了2 000多年。公元1180年,傣族首领帕雅真把各部落统一起来,建立了景洪金殿国地方政权,但仍接受中国宋代封建王朝的统治。后来,傣族统治者把管辖地区分为12个大的征赋地区。用傣语来说,12叫"西双",地区叫"版纳"。因此,西双版纳这个名字有着深远的历史含义。

千百年来,这里的居民与大自然协调相处、发展,形成了诸如傣族的龙山文化和人工薪炭林、哈尼族的藤类保护森林以及各民族的水稻农业和庭院生态系统等优秀的土地和自然资源利用模式,对保护西双版纳的生态环境起着积极的作用。例如,傣族的龙山森林和早在400多年前就有种植铁刀木(*Cassia siamea*)薪炭林,解决燃料问题的传统,即是他们传统的环境知识的体现。龙山仅仅是位于村寨附近的一片原始森林,他们认为,龙山是神居住的地方,龙山里的动植物是神的伴侣,任何有生命的资源都是严格保护不得侵犯的,诸如采集植物、打猎、伐木、种地都是不允许的。如果在龙山里做了有辱神灵的事,就会惹怒神灵,将遭到如洪水、火灾、风暴、地震、虫灾或被野兽攻击等惩罚。受傣族文化的影响,其他一些民族也有自己的龙山。龙山文化虽带有宗教色彩,却有效地保护了大自然,据调查,在西双版纳有龙山约400处,总面积近50 000hm^2,她像沙漠里的绿洲一样散布在耕地和橡胶种植园之间。

西双版纳是中国50年代建立的少数保护区之一,初期由勐养、勐仑、大勐龙和勐腊等4片组成。到了80年代,保护区的保护和管理工作越来越健全,并扩大到地理上互相分割的5片。为实现保护该地区特殊的生物多样性和文化多样性及持续发展的总目标,保护区同众多国内、外科研单位合作,进行了资源本底调查、发展规划等一系列科学研究与国际合作交流。近年又作为实施"全球环境基金(GEF)中国自然保护区管理项目"的保护区之一,积极开展公众教育、实施社区共管试验示范。在中国人与生物圈国家委员会的组织协调下,同联合国教科文组织合作开展的"南--南合作计划",以及加拿大国际发展研究中心(IDRC)援款项目"西双版纳生物圈保护区生物多样性保护与持续发展"等国际合作研究,将地理信息系统(GIS)等先进技术与当地传统知识相结合,探索自然保护与社区经济协调发展的模式,取得显著成效,促进了保护区及当地经济的持续发展。

西双版纳生物圈保护区以其独特的自然景观、丰富的生物多样性和民族文化多样性而闻名于世,已经成为科研、教学、教育、培训基地和传统知识与现代技术融于一体的示范地和生态旅游的热点地区,吸引着无数国内外科学家及旅游观光者,每年接待海内外游客150余万人次。云南

省及景洪自治州已将西双版纳的生态旅游作为带动地方社会经济发展的支柱产业，进行扶持和建设。区内已建成“版纳野象谷森林公园”、“绿石林”、“翠屏峰”、“补蚌望天树”等旅游景区。

迷人的西双版纳，将以其特有的魅力迎接远方的客人，她将使你领略到热带雨林中多姿多彩的自然风貌；聆听到动物、昆虫世界美妙的天然交响乐；欣赏到浓郁的民族风情；获得求知欲的满足；留下无穷的回味。

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Xishuangbanna Biosphere Reserve

Location: Jinghong, Mengla, Menghai Counties, Xishuangbanna Prefecture of Yunnan Province
Area: 241 776 hm^2
Altitude: 477～2 429 m
Main objectives for protection: primeval tropical forest ecosystem and wild Asian elephant
Established: 1958
National Nature Reserve designation: 1986
UNESCO World Biosphere Reserve designation : 1994

Renowned as "a tropical land with coexistingnatural diversity and cultural diversity," Xishuangbanna Biosphere Reserve is blessed with rich variety of tropical and subtropical biological resources and is inhabited by more than 10 nationalities who have similarities in culture, religion and languages with the countries of Laos, Myanmar, Thailand and Vietnam.

The reserve is situated in the southward extension of Hengduan Mountains. The topography is gently rolling with higher elevations in east, north and west. Lancangjiang River and its branches flow across the area, which is crisscrossed with mountain land, hill, valley and basin. The main climate is a north tropical monsoon. The area is affected by the Pacific monsoon and the Indian Ocean monsoon due to its transitional location from inland Asian to the Indo－China Peninsula, south of the Tropic of Cancer, and also by the Ailaoshan mountain and Wulian range of mountain in the north, which prevents cold air from flowing southward. The area therefore has higher cumulative temperatures in winter and more precipitation (1 850 mm annually) in summer than the areas at the same latitudes. All of the above mentioned factors result in high temperature and moist climate in Xishuangbanna Biosphere Reserve.

Geographical and climatic conditions make the reserve the largest and best preserved tropical forest ecosystem in China. Being in the transition of two key areas of biological diversity distribution between north tropics and subtropics, the compositions of flora and fauna are complex and highly diverse with a confluence of species from south and north, east and west, and ancient and modern. The tropical rain forest here shares the

typical features of southeast Asia rain forest and is also distinguished by the transitional and seasonal properties of its own. The tropical landscape elements are very commonly seen in this tropical rain forest, i. e. the stranglers, buttresses, cauliflory (The strange phenomenon of flowers and fruits growing on the old stems), giant vines, tropical wild flowers and white ant holes. There are more than 8 types of vegetation including tropical forest, tropical monsoon forest, subtropical evergreen broadleaf forest, bryophyte – evergreen broadleaf forest and deciduous broadleaf forest etc. Among its over 4 000 species of higher plants, 56 species were listed as State protection priorities. There are 343 species of ancient genera, monogenera, oligogenera, relicts, rare and endangered plants, of which 35 species are palaeo – tropical relicts, e. g., *Cyathea spinulosa* and Henry magnolia (*Magnolia henryi*), 153 species of endemics, e. g., manglietia (*Manglietia wangii*) and Chinese parashorea (*Parashorea chinensis*), 134 species of rare plants, e. g., naked flower tetrameles (*Tetrameles nudiflora*) and *Vatica xishuangbannaensis* and 28 species of wild close relatives of cultivars, such as wild rice (*Oryza meyeniana*) and villous amomum (*Amomum villosum*).

Xishuangbanna has a concentration of rare and precious animals including snakes. Of the 2 100 animal species in total, there are 102 species of mammals, 427 species of birds, 1 437 species of insects. Thirty six species were listed as animals with State protection, including Asian elephant (*Elephas maximus*), white – face gibbon (*Hylobatos oncolor lencogenys*), Indo – Chinese tiger(*Panthera tigris corbeffi*), binturong (*Arctictis binturong*), gaur (*Bos gaurus readci*), green peafowl (*Pavo muticus imperator*) and peacock – pheasant (*Polylectron bicalcaratum*).

More than 10 nationalities, each with their specific culture, live together in the reserve. They are the nationalities of Dai, Han, Hani, Lahu, Yi, Jinuo, Bulang, Yao, Kemu etc. They are different from one another in culture, religion, language, architecture, drinking and eating habits, clothing and festivals. Even the names of places are gifted with special local colours. The Dai nationality has a residence history of more than 2 000 years. In 1180 the Dai leader Payazhen unified its subordinated tribes and established a local authority named Jinghong Jindian, which was still under the rule of Chinese Imperial Court of the Song Dynasty. Later the ruler of Dai divided its land of jurisdiction into 12 tax – levying districts. The "12" is called "Xishuang" by Dai people and the "district" is called Banna. That is the origin of the name Xishuangbanna.

The residents here have had a friendly relationship with nature for hundreds and thousands of years. During the long history there developed many special types of land use and natural resource management. Examples include the Longshan culture and the artificial fuel wood plantation, the Hani people's Liana – protected forest, the rice farming, the home garden ecosystem and many others, which have had positive effects on ecological and environmental protection of Xishuangbanna. As early as 400 years ago, the fuel wood tree siamese suna (*Cassia siamea*) was planted to meet local demand for fuel. "Longshan" is a primeval forest near the village, where the Dai people believe God lives and so the animals and plants are God's companions deserving to be strictly protected from invasion, such as collecting, hunting, felling and cultivation. Influenced by Dai culture, other nationalities have their own Longshan. Obviously, Longshan culture is painted with religious colour and it effectively protects nature. It is estimated that there are 400 Longshans in Xishuangbanna covering a total area near 50 000 hm^2, which are scattered between farmland and rubber tree plantations just as oases are distributed in deserts. The Longshans are convincing evidence for the Dai traditional knowledge of environment protection.

Xishuangbanna is one of China's few reserves founded in the 1950s. It was formerly composed of four patches of land, i. e., Mengyang, Menglun, Damenglong and Mengla. With the improvement of protection and management, the reserve was extended in the 1980s to include five separate patches of land. For the sake of implementing the general goal of protecting the special biodiversity and cultural diversity as well as the goal of sustainable development, a series of research projects and international exchanges and collaborations have been undertaken by the reserve with many scientific bodies both at home and abroad for baseline investigations and development planning. Recently the reserve was approved as one of the Nature Reserves of a GEF project in China. The reserve has taken an active role in public education and demonstration of community participatory management, is part of the "South – South Cooperation Programme" of UNESCO and is a participant in the Canada – International Development Research Center (IDRC) financed project on "Biodiversity Conservation and Sustainable Development of Xishuangbanna". The latter uses GIS techniques combined with traditional knowledge to search out a model that can reconcile nature conservation and community economic development. Remarkable progress has been made in these aspects.

Famous for its particular natural landscape, rich

and colorful biodiversity and multi – national culture, the reserve has become a base for research, education and training and a pilot area integrating traditional knowledge and modern technologies, as well as a hot spot for ecotourism. It has attracted immense numbers of scientists and tourists from within and without the country with a yearly figure over 1.5 million. Ecotourism in Xishuangbanna has become the pivotal industry of Jinghong Autonomous Prefecture and Yunnan Province. The sight – seeing areas have been reconstructed into "Banna Valley Forest Park for Wild Elephant", "Green Stone Forest", "Cuiping Peak" and "Bubang Chinese Parashorea". The fascinating Xishuangbanna welcomes guests from afar with its specific enchantment, feasting people's eyes on the varied and interesting natural scenery of tropical rain forest and serenading people with its natural symphony made by animals and insects. All visitors will be so satisfied by Xishuangbanna, being a place displaying the beauty of nature mixed with the beauty of human culture, that they will be deeply impress forever.

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茂兰生物圈保护区

Maolan Biosphere Reserve

▲ 茂兰喀斯特森林外貌

Physiognomy of Maolan Karst forest.

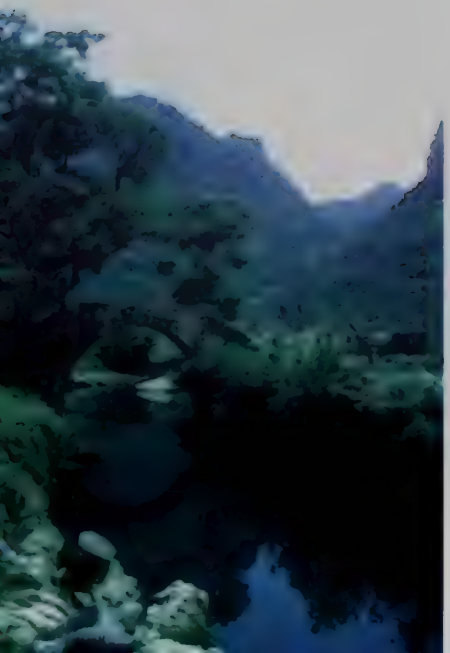
▶ 山水幽奇的鸳鸯湖

The wonderful mandarin duck lake.

◀ 大七孔天生桥
Natural bridge with seven big holes.

▲ 地下龙宫
Under ground dragon palace.

▲ 喀斯特漏斗森林（为森林密集覆盖的喀斯特峰丛漏斗，四周群山封闭，底部分布有漏斗式落水洞，状若深邃的绿色窝穴）
Karst funnel forest (Karst peaks and funnels covered by dense forest, surrounded by mountains, with sink holes distributed at the bottom, deep as green pits).



◀ 瑶所古石桥
Ancient stone bridge in Yaosuo

茂兰生物圈保护区

地理位置：贵州省荔波县

面　　积：21 285hm^2

海　　拔：414～1 071m

保护对象：中亚热带喀斯特森林生态系统及珍稀动植物

建区时间：1987 年

晋升国家级自然保护区：1988 年

纳入联合国教科文组织世界生物圈保护区网络：1996 年

茂兰旅游示意图

Tourism Map of Maolan

在绵延起伏的喀斯特峰丛之上，林海浩瀚；高低悬殊的漏斗中，浓荫蔽日；深邃的喀斯特漏斗森林层层叠置；开阔的喀斯特洼地森林蝉联展布；森林滞留泉随处可见，山青水秀，鸟语花香。这，就是喀斯特地貌形态和碧绿的森林融为一体的茂兰生物圈保护区所特有的自然风貌。

茂兰保护区是我国亚热带乃至世界上同纬度地区残存下来的绝无仅有的一片分布集中、原生性强、相对稳定的喀斯特森林生态系统保护区。区内山峰陡峻，各种负地貌如落水洞、漏斗、洼地、盲谷、溶洞十分发育。特别值得一提的是，在同一含水岩组之中，由枯枝落叶垫积层充填的上层喀斯特裂隙水和下层喀斯特水同时并存。上层水流量小且动态较稳定，下层水流量大，动态变化也相对较大，形成茂兰喀斯特森林水文地质的独特现象——地下水赋存的二元结构。它不仅使地下水的补给、赋存及径流条件明显改变，而且还使大气降水、地表水和地下水的互相转化产生良性循环，为动植物的繁衍和人类的生存创造了良好环境。

茂兰保护区地处中亚热带向南亚热带过渡的季风湿润气候区，温暖、湿润，生物地理区属古北极生物地理界中国亚热带森林省，由于受喀斯特地质地貌的影响，形成了石灰岩常绿落叶阔叶混交林，与滇、桂两省植物关系较为密切。区内动植物资源十分丰富，有种子植物近 1 300 种，属于国家一、二级保护树种有南方红豆杉（*Taxus chinensis* var. *mairei*）、香果树（*Emmenopterys henryi*）等 8 种，中国特有种 15 种；还发现有石山木莲（*Manglietia calcarea*）、荔波鹅耳枥（*Carpinus lipoensis*）、波大节竹（*Indosasa lipoensis*）等 20 多个新种。动物区系属东洋界华中区西南山地亚区黔中山地丘陵地理省，有脊椎动物 300 多种，其中鸟类 140 余种，属于国家重点保护的有华南虎（*Panthera tigris amoyensis*）、豹（*P. pardus*）、猕猴（*Macaca mulatta*）、小灵猫（*Viverricula indica*）、苏门羚（*Capricornis sumatraensis*）等 30 多种。

由于碳酸盐岩石是可溶性岩类，在一定的地质、气候和水文等条件下，通过地表水和地下水对这类碳酸盐岩石的溶蚀作用，产生了一系列特殊的地表形态和地下形态（如各种通道和洞穴），地表水与地下水在水平与垂直循环中穿通一气，共同活动。这种具有特殊地貌和水文现象的地理区域，早在 19 世纪末，南斯拉夫学者 J. 茨维奇（J. Cvijic）在南斯拉夫西北部伊斯特利亚（Istria）半岛上，最早研究了喀斯特（南斯拉夫语为 Kars 或 Kas）地区石灰岩高原的这种奇特地貌。所以，100 年前已开始把这一地区名称作通用名词，至今“喀斯特”（Karst 德语）已成为世界各国通用的专门术语。分布在喀斯特地貌上的这种特殊的森林生态系统，在世界植被中占有十分重要的位置。在地球上喀斯特森林几乎被破坏殆尽的情况下，我国茂兰还保存了这一集中连片、大面积

的原生性较强的喀斯特森林原始自然本底，足见其更具有特殊的重要意义。

茂兰保护区建立后，同国内外科研单位合作开展了本底资源、森林生态、野生兰花、洞穴生物、森林猛禽、水文地质等一系列科学考察和研究活动，积累了大量本底资料。近年又纳入林业部“中国森林、荒漠、湿地生态系统——监测网络建设发展规划”，拟建茂兰喀斯特森林生态系统定位研究站，将为进一步探索喀斯特森林生态系统的奥秘及其科学管理模式创造条件。

茂兰保护区地处贵州南部少数民族聚居的贫困山区，从一开始即将扶持当地社区发展经济纳入管理规划，划定管理范围，实行分片包干的管理责任制。从资金、技术及人力等多方面扶持，帮助当地社区兴修水利、架桥、修路、用电、造林、饲养野生动物、发展教育、卫生等，使当地群众从保护区受益并主动参与保护管理，形成保护与当地群众和谐的关系。保护区利用其资源优势，种植经济林果和药材、饲养繁殖野生动物，并组建了荔波喀斯特经济开发有限责任公司，开展生态旅游，增强了自身的经济实力，同时也带动了当地社区经济的发展。

茂兰生物圈保护区极珍贵的喀斯特森林所包含的复杂而深奥的科学内容，不仅为科学研究和监测提供了天然实验室，而且在相当广泛的程度上超越了一般喀斯特地貌荒芜的情调，她把“上有森林，下有洞林，石头上长树，岩缝里盘根”等一系列奇特森林景观与喀斯特特有的明河暗流、地下河出口、地下河天窗、上升泉、下降泉、瀑布、深潭、溶洞等水文地质景观柔合在一起，更兼有许多珍奇的野生动植物和当地瑶族、布依族等少数民族传统文化，使无数中外游客和专家学者为之倾倒。不去不知道，去了忘不了。愿茂兰保护区奇特的自然美景永远珍藏在您温馨的记忆里……。

联系地址：中国贵州省荔波县玉屏镇茂兰自然保护区管理处
邮政编码：558400
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Maolan Biosphere Reserve

Location: Libo County, Guizhou Province
Area: 21 285 hm^2
Altitude: 414～1 071 m
Main objectives for protection: central subtropical karst forest ecosystem and rare and precious species
Established: 1987
National Nature Reserve designation: 1988
UNESCO World Biosphere Reserve designation: 1996

Among the groups of Karst peaks there is an extensive forest distributed either tier upon tier on the Karst funnels, or continuously on the open depressed areas with streams flowing here and there and birds flying and singing in the green mountain. That is the peculiar landscape mixing the Karst geomorphology with forest that the Maolan Biosphere Reserve enjoys. It is the relic original forest ecosystem with relative stability, and its distribution is very localized in the reserve, which is scarcely found in China and even in the area of the same latitude in the world. Integrated with the steep peaks, various kinds of negative land forms are well developed, such as the sinkhole funnel, depressions, blind valleys and corrosive holes. It deserves specific mention that, in the same group of water-bearing rock, there is a coexistence of fissured water filled with litter debris in the upper layer and Karst water in the underline layer. The upper flow is small and stable, but the underline flow is larger and unstable, which forms the unique phenomenon of the hydrogeology of Maolan Karst forest, i. e, ground water with binary structure. This property not only alters the supplementation, maintenance and runoff conditions of ground water, but also creates a favourable cycle of interchange among precipitation, surface water and ground water and thereby creates a sound environment for animals, plants and human beings as well.

Lying in the moist monsoon area or a transition from central subtropics to south subtropics , the reserve belongs to the Subtropical Forest Province of China of the Palearctic Biogeographical Region. Influenced by Karst geology and topography, the limestone-mixed evergreen and broadleaf forest thrives there , which is floristically close to Yunnan and Guizhou Provinces. There are 1 300 species of seed plants, among those eight were listed as the first and the second classes of national protection, e. g. , maire yew (*Taxus chinensis* var. *mairei*), Henry emmenopterys(*Emmenopterys henryi*) and other 15 species are China ' s endemics. More than 20 species were newly discovered, such as mangliete (*Manglietia calcarea*), thorn bean (*Carpinus*

lipoensis) and indosasa (*Indosasa lipoensis*).

The fauna belongs to Oriental Region, which contains over 300 species of vertebrates and 140 species of birds. Among those are 30 species of more of national protection, e.g., South China tiger (*Phanthera tigris amoyensis*), rhesus monkey (*Macaca mulatta*), leopard (*Panthera pardus*), small Indian civet (*Viverricula indica*) and mainland serow (*Capricornis sumatraensis*).

The special forest ecosystem on Karst land is very important in the world vegetation, because the Karst forset elsewhere on the earth has been almost entirely destroyed. Maolan Biosphere Reserve is particularly significant for this kind of forest, still preserved.

Since its founding, the reserve has carried out an array of scientific investigations in collaboration with other institutes at home and abroad, e.g. forest ecology, wild orchids, cave animals, forest prey birds and hydrogeology. Recently, the reserve has been included in the "Planning of the Establishment and Development for a Monitoring Network for the Forests, Deserts and Wetlands in China". The establishment of the Permanent Research Station for Maolan Karst Forest Ecosystem is under consideration, which will lay the foundation of further revealing the mystery of the Karst forest ecosystem and identifying the corresponding model for its scientific management.

Being in the poor and remote mountain area of southern Guizhou, where the minority nationalities are concentrated, the reserve has brought the work of helping the local people to boost their economy into line with its own management planning from the very beginning. The reserve gave various types of spport to the local people ranging from funds and techniquse to human resources. Unremitting efforts have been made with respect to water conservancy construction, bridge building, road construction, power supply, afforestation, wild animal demestication, education and hygiene and public health affairs. The local people have benefited from the participatory management and therefore a harmonized relationship has been created with the reserve. While making use of the advantageous condition of natural resources to plant economic trees and medicinal plants and to breed wild animals, the reserve founded a "Libo Karst Economic Development Company" and initiated ecotourism to strengthen its economic vitality and also to spur on the local economy.

The precious Karst forest, the reserve not only offers a natural laboratory for science and monitoring, but also displays a unique forest landscape with special hydro-ecological phenomena, which is far different from people's general impression of Karst geomorphology being a waste land. Additional tourist attractions include the living forest on the ground and the stone forest of corrosive holes underground, trees growing on the stone with its

roots twisting through crevices in the rock, rivers flowing into the ground, underground rivers flowing out of the ground and waterfall dropping into the deep pond, interesting scenery, rare and precious plants and animals and the traditional culture of the local minorities of Yao and Buyi. "To see is to believe"; the Maolan Biosphere Reserve welcomes You all year-all seasons.

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◀ "活化石"野银杏

(Ginkgo biloba)

Wild Ginkgo *(Ginkgo biloba)*

"living fossil ".

天目山生物圈保护区

Tianmushan Biosphere Reserve

▶ 银杏果

The fruits of Ginkgo

▲ 丛林禅源

Buddhism originated from forests.

▲ 国家二级保护植物金钱松 *(Pseudolarix kaepferi)*

Golden larch *(Pseudolarix kaepferi)*- a plant under the second class of national protection

▲ 古老的柳杉 *(Cryptomeria fortunei)* 林

Old forest of Chinese cedar *(Cryptomeria fortunei)*

▲ 天目秋色（雨华亭）

Autumn scenery of Tianmu (Pavilion of Yuhua)

天目山生物圈保护区

地理位置:浙江省临安市

面　　积:4 284hm^2

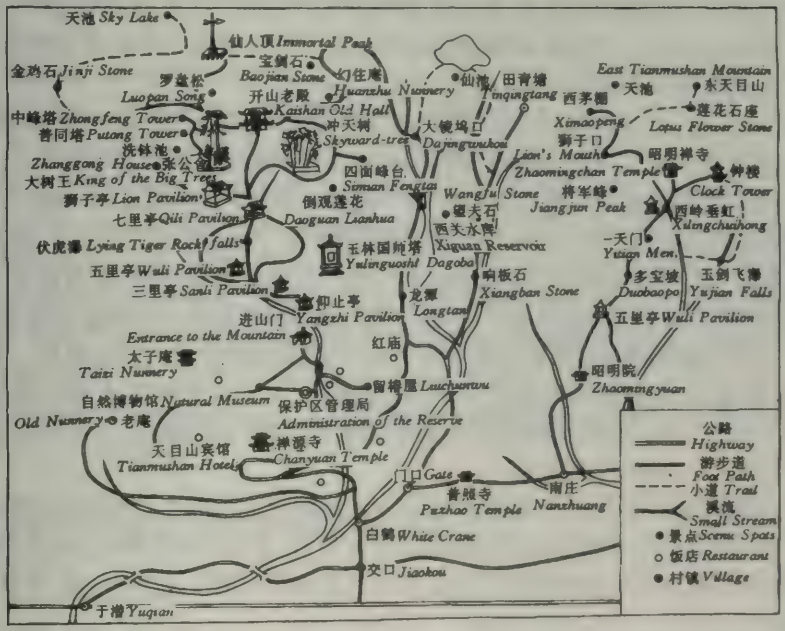
海　　拔:250～1 506m

保护对象:中亚热带森林生态系统及自然地理和人文景观

建区时间:1956 年

晋升国家自然保护区:1986 年

纳入联合国教科文组织世界生物圈保护区网络:1996 年



天目山旅游示意图

Tourism Map of Tianmu Mountain

天目山分东天目山和西天目山，因东西两峰山顶各有一个“天池”，状如双目仰望蓝天，固而得名。天目山为“江南古陆”的一部分，在距今约 1.5 亿年时，火山活动强烈，喷发了大量火山物质，形成了现今的天目山山体。山势自西南东北逐渐降低，最后没入长江三角洲平原，是长江和钱塘江部分支流的发源地和分水岭，素有“江南奇山”之称。

天目山地处东南沿海丘陵、中亚热带北缘，季风强盛，四季分明，气候温和，雨量充沛，光照适宜，为生物物种的生存繁衍提供了良好条件。区内有高等植物 2 100 余种，脊椎动物 280 余种，昆虫 1 800 余种。其中，列为国家重点保护的植物 35 种，动物 35 种。天目山植物区系起源古老、复杂，温带、亚热带的东亚区系成分特征显著，名木古树、特有种属繁多。这里幸存着最古老的野生银杏（*Ginkgo biloba*）和柳杉（*Cryptomeria fortunei*）群落及许多特有珍稀动、植物。自 1927 年由中国学者发表了第一个以“天目”命名的植物新种天目铁木（*Ostrya rehderiana*）以后，有 37 种植物相继以“天目”命名。1884 年由德国学者发表了第一个以“天目”命名的动物新种天目缘花天牛（*Anoplodera excavata*），此后，相继有 48 种动物以“天目”命名。国内、外采自天目山的植物模式标本达 55 种，动物模式标本 177 种。

天目山林木以“古、大、高、稀、美”著称。“古”，首推有“活化石”之称的第四纪冰川时期的孑遗植物——野生银杏；“大”，天目山拥有世界罕见的大柳杉群落，树龄在数百年乃至千年以上的有 500 余株。被清朝乾隆皇帝封为“大树王”的一株柳杉，在宋代即称为“千秋树”，树龄长达2 000 余年，单株材积为 75.42m^3；“高”，人称“冲天树”的金钱松（*Pseudolarix kuepferi*），最高株达 56m，居全国同类树之冠；“稀”天目铁木有“地球独生子”之说，全球已濒临灭绝，唯有西天目山幸存 5 株；“美”，区内生物资源丰富，植被类型多样，季相变化明显，四季展示不同的森林画卷。

天目山自古又为宗教名山，佛教文化十分悠久。西汉时即有道人在此修炼。佛教始于晋代，唐代初具规模，曾有近 50 处道宫和寺院庙堂，僧众盈千，为日本临济宗永源寺派发祥地，日僧称天目山为祖山，常有日本、印度、朝鲜等国高僧前来参拜。历代寺院都有专职“巡山和尚”看护，对早期的自然生态起了一定的保护作用。

丰富的人文景观及其文化遗产也是天目山一大特色。从古至今，历代文人墨客纷至踏来，梁代昭明太子萧统、北周著名文学家庾信，唐代大诗人李白、苏轼，元代张羽，明代刘基、徐渭、袁宏道、清乾隆皇帝等都曾到天目山吟诗作画，留下了大量文学佳作。1939 年春，周恩来曾来此作团结抗日的讲演。

天目山特殊的地质地貌和丰富的生物资源，吸引了国内、外众多学者前来探索。早在 30 年代即有德国学者到天目山采集昆虫标本，先后有前苏联、日本、瑞典、美国、波兰、加拿大、英国、意

大利等外国学者来此考察。我国著名地质学家李四光、植物分类学家和林学家秦仁昌等都曾多次到天目山考察、研究。天目山自然保护区建立后，组建了科研所，同有关科研单位和高等院校合作开展了资源本底调查、规划、珍稀树种繁殖研究，以及药用资源植物开发利用研究等一系列科研活动，为保护区管理与资源合理利用提供了科学依据。创办了《天目山》杂志，成为中国仅有的几个创办刊物的保护区之一。同时，接待了来自全国各地70余所大专院校和科研单位的教学实习和考察、研究。1989年建成2 400m^2的自然博物馆，动、植物、昆虫标本展厅、实验室、书画屋、教室、会场等设施齐全，展出本区采制的标本700余件，为科教活动提供了良好条件。

天目山生物圈保护区具有健全的管理机构和一支训练有素的职工队伍，在管理上成功地摸索出一条保护与发展相协调的新路子。同当地社区建立了联防体系，制定了联防公约，实施社区共管，取得了良好效果。在当地政府部门的支持下，将部分居民成功地迁移出核心区，并为其提供就业，进行妥善安置，改善了保护区内部环境。为更有利于生物多样性的保护，1983年将保护区面积从1 050hm^2扩大至4 284hm^2。扩区后，确定了“权属不变、农户不迁、联合管理、利益分享”的原则，进行配套建设，相继建成休养所、邮电所、银行、医院等基础设施，同时改建和新建公路30余公里，促进了保护区自身和当地社区经济的共同发展。

地处沪、浙、皖的旅游热线和工业发达、人口稠密的东海之滨的天目山，资源丰富，景色秀丽，宗教文化源远流长，历来就是众多海内、外学者、游人向往之地。80年代以来，天目山的旅游事业有了进一步发展，已将生态旅游作为促进保护区自身发展并推动地方经济发展的支柱产业。每年接待游客达10万人次，旅游收入近500万元。同时利用其资源优势开展多种经营，开发天目山云雾茶、天目笋干、天目青豆、白果、山核桃等绿色食品和优质矿泉水，建成毛竹园、苗圃、桃园等经济林地，为地方经济的发展注入了活力，创造了良好的契机，提供了就业条件，扩大了农副产品的销售市场，达到了生态、社会、经济三效益的有机统一。

天目山生物圈保护区的实践，为在人口稠密的大中城市周边实现生物多样性保护与持续发展相协调提供了有力的例证。

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传　　真：(+86-0571)3851338

Tianmu shan Biosphere Reserve

Location: Linan City, Zhejiang Province
Area: 4 282 hm^2
Altitude: 250 ~ 1 506 m
Main objectives for protection: mid - subtropical forest ecosystem, natural and cultural landscape
Established: 1956
National Nature Reserve designation: 1986
UNESCO World Biosphere Reserve designation: 1996

Eulogized as the "Wonderful mountain in the South of the Yangtze River", Tianmushan Mountain (eyes in the sky in Chinese meaning) was named because of two sky lakes lying on the two peaks of east and west respectively, which look like two eyes looking up at the sky.

The mountain is a part of China's ancient land in the South of the Yangtze River formed by volcanic activities about 150 million years ago. Its elevation lowers gradually from southwest to northeast until it finally contacts the plain of the Yangtze Delta. It is the origin of some branches of the Yangtze River and the Qiantang River.

The mountain stretches on the southeast coastal hills and also the north edge of the mid - subtropics prevailed by monsoon. The distinctiveness of four seasons, mild temperatures and rich rainfall as well as appropriate light condition provide a good environment for living things. There are more than 2 100 species of higher plants, some 280 species of vertebrates and more than 1 800 species of insects, among those 35 species of plant and animal each have been listed as State priorities for protection. As the flora is characterized by antiquity and is complex and the temperate and subtropical elements of the East Asian region predominates, the mountain is blessed with well - known and ancient trees among a variety of endemic and rare plant and animal species. The natural communities of ginkgo (*Ginkgo biloba*) and Chinese cedar (*Cryptomeria fortunei*) are the most ancient.

Ever since the Chinese scientist published *Ostrya rehderiana*, a new plant species named for Tianmu in 1927, 37 species have also been named for Tianmu. Similarly, since the German scientist published *Apoplodera excavata*, the new animal species named for the mountain for the first time, there have been 48 species named after the Tianmushan Mountain. 55 type specimens of plant species and 177 type specimens of animal species have been collected from this mountain by Chinese

people and foreigners.

The trees on the mountain are famous for their "ancientness, bigness, highness, rareness and beauty". For example, the relics from the Quaternary glacial period include the ginkgo, the big – sized Chinese cedar community consisting of more than 500 individuals of several hundred to over one thousand years of age. Standing among those, is a King of Chinese cedar, which has lived over 2 000 years and has a timber volume of 75.42 cube meters. The tallest specimen of golden larch (*Pseudolarix kaepferi*) reaches 56 m and the only 5 individuals of the rare and endangered plant *Ostrya rehderiana has* survived in the western mountain. The noticeable phenologic alteration in the various types of vegetation tells the story of the beauty of the creatures.

Tianmushan Mountain is also a well – known holy land of Buddhism, which enjoys a long history. There had already been some 50 temples holding more than one thousand monks and nuns during the Tang Dynasty. One branch of Japanese Buddhism originated from here. Japanese monks call Tianmushan Mountain "Ancestor mountain", and higher ranking monks from Japan, India and Korea often come to worship. The professional "patrolling monks of the temples" have made certain contributions to the nature conservation through the ages. As a result, the rich cultural heritage is also one of the characteristics of the mountain which attracts great writers, poets and artists to come and do their excellent works. Among those great names in history are the literary giant Li Bai, Su Shi of the Tang Dynasty, Emperor Qianlong of the Qing Dynasty and late Premier Zhou Enlai.

The special topography and colourful biological resources of the mountain have a strong appeal to the scholars at home and abroad. In the 1930s, German scientists came to collect insects, then followed scientists from the former Soviet Union, Japan, Sweden, USA, Poland, Canada, England and Italy. The respected Chinese geologist Prof. Li Siguang and botanist Prof. Qin Renchang had made investigations here many times. Collaborating with other scientific units, the reserve has carried out a series of research projects especially after it had a research institute of its own. Studies included the background investigation and planning of the reserve, the studies on the reproduction of rare and precious species and the development of wild medicinal plants, which offer much baseline information to the reserve's management. A magazine entitled "Tianmushan" was published by the reserve, which is rarely done by China's Nature Reserves.

The rather perfect facilities actively effecting science and education include a 2 400 square meters nature museum built in 1989 displaying over 700 items of plant, animal and insect specimens, the laboratories, reading room and meeting hall.

The reserve has a proper administrative structure

and a team of well – trained staff members. A novel approach to effective management has been found by way of a community – involved management system, which can successfully reconcile conservation and development. With the support of the local government the residents have partially moved out of the core area to earn new livelihoods. With the improvement of the environment in the reserve, the conservation of biological diversity is in favorable circumstances. In 1983 the reserve expanded its area from 1 050 to 4 284 hm^2 and formulated a principle of "No change in local people's rights; no relocation of farmers; running the involved management with benefits sharing". The ensuing infrastructure has been completed including sanatorium, post – office, bank, hospital and 30 km of newly constructed and improved highway.

Besides the rich resources, the beautiful scenery and long – standing religious culture, Tianmushan Mountain is in an advantageous location, which is in the popular tourist area of Shanghai, Zhejiang and Anhui provinces and also the densely populated and developed coastal area of the East Sea. The mountain has long been an attractive destination for visitors. Ecotourism with 100 000 visits and 5 million Yuan of income each year, has been developed as a pivotal industry to give impetus to the reserve's development and the local economy as well. The reserve's development and the local economy also benefit from the management of the multiple resources, e. g., tea, dried bamboo shoot, bean, ginkgo seed and the spring water of quality among the local products.

The success in the management of Tianmushan Biosphere Reserve offers convincing evidence for reconciliation between conservation and development in the peripheral areas of the densely populated large – and medium – sized cities.

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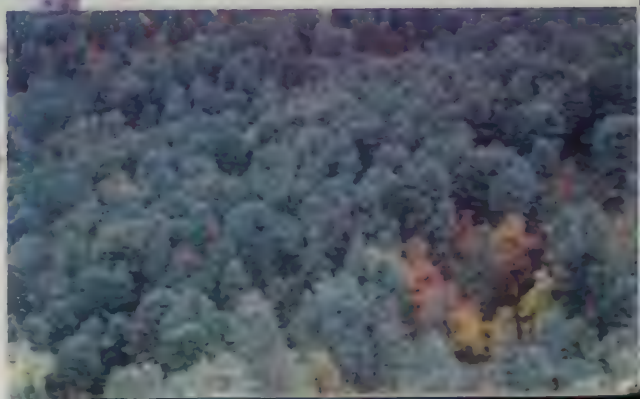
◀ 好大的红松 *(Pinus koraiensis)*
How big the Korean pine *(Pinus koraiensis)* is!

丰林生物圈保护区
Fenglin Biosphere Reserve



▶ 丰林秋色（红松阔叶林）
Autumn at Fenglin (Korean pine and broadleaf trees).

▲ 雪后红松林
Snow-decorated Korean pine forest

▲ 椴树红松林 Amur linden *(Tilia amurensis)* and Korean pine *(Pinus koraiensis)* forest

▶ 汤旺河初雪
The first snow on Tangwang river

丰林生物圈保护区

地理位置:黑龙江省伊春市

面　　积:18 165.4hm^2

海　　拔:283～688m

保护对象:红松等珍稀物种及温带森林生态系统

建区时间:1958 年

晋升国家自然保护区:1988 年

纳入联合国教科文组织世界生物圈保护区网络:1997 年

位于小兴安岭山地南段的丰林生物圈保护区,是温带针阔叶混交林内最典型的森林生态系统,也是我国保存最完整,面积最大的原始红松(*Pinus koraiensis*)林区。原始阔叶红松林是经历了各种气候波动和其它自然因子的干扰后才演化成的物种最丰富、结构最复杂、生物量最高,并符合当地生境条件和具有自我维持能力的顶极群落。该区三面环水,一面依山,莽莽林海,延绵不断,混交林带,色彩万千,犹如绿色宝库中的一颗明珠。成为我国东北"林海"中最有代表性的森林类型和珍贵的自然界原始"本底"。

红松是这片温带针阔叶混交林中的主角,陪伴它的还有红皮云杉(*Picea koraiensis*)、鱼鳞云杉(*Picea jezoensii* var. *nicrosperma*)、落叶松(*Larix gmelinii*)、枫桦(*Betula costata*)、紫椴(*Tilia amurensis*)、黄檗(*Phellodendron amurense*)、香杨(*Populus koreana*)等乔、灌、草 500 余种植物。林内层层叠叠,种类繁多,相互依存,相互制约,形成了完整的红松林生态系统。

红松是世界上珍贵的孑遗物种,其全身是宝,具重要经济价值。材质轻软,耐腐力强,不易干裂,不易曲挠,纹理通直,种籽含油量高达 70% 以上,营养价值极高,树干含松脂,能提炼松香、松节油,松针可提炼松针油,是富含油脂、蛋白质的高级化妆品原料和优良的用材、经济树种之一。

该区气候受西伯利亚寒冷高压气流的影响,冬季寒冷干旱,夏季湿润多雨,年平均气温 -0.5℃。地势西北高,东南低,丰林河、汤旺河贯穿全境。

茂密的森林和特殊的气候环境,孕育了丰富的种质资源,为鸟、兽提供了良好的栖居繁殖场所。区内有梅花鹿(*Cervus nippon*)、马鹿(*C. elaphus*)、狍子(*Capreolus capreolus*)、猞猁(*Felis lynx*)

等野兽63种,有鸟类42种,昆虫404种。

丰林生物圈保护区有健全的管理机构,围绕保护好红松林及其生态系统加强保护与管理工作,尤其是森林防火事关全局,引进先进技术和设施,使防火手段向科学化迈近,建有高达40余米、装有高倍望远镜、无线电台等设施的防火了望台,实现了38年无森林火灾。与科研单位合作开展以红松林生态为重点的科学研究,如地理信息系统(GIS)用于信息管理、森林防火预测预报和保护区管理规划等研究工作,为保护区的科学管理提供了依据。同时,利用动、植物标本室、自然景观图片展览室广泛开展群众性环境保护意识教育和法规教育,发挥了保护、科研、教育、发展等综合功能。

丰林保护区有着较大旅游潜力,其苍松挺拔,郁郁葱葱,鸟语花香的红松林生态系统犹如一幅景色秀丽的山水画卷,为人们提供了考察研究和度假旅游的理想场所,受到国内外各界人士的广泛关注。1989年开始,拉开了生态旅游的序幕。众多海内、外学者和游客纷纷前来观光考察,促进了生态旅游的快速发展,为保护区的持续发展创造了良好条件。

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Fenglin Biosphere Reserve

Location: Yichun City, Heilongjiang Province
Area: 18 165.4 hm^2
Altitude: 283 ~ 688 m
Main objectives for protection: Korean pine and temperate forest ecosystem
Established: 1958
National Nature Reserve designation: 1988
UNESCO World Biosphere Reserve designation: 1997

Lying on the south side of Xiaoxinganling mountain, Fenglin Biosphere Reserve is a typical forest ecosystem in the temperate coniferous and broadleaf mixed forest zone and is the largest and the best preserved virgin Korean pine (*Pinus koraiensis*) forest area in China. The reserve is surrounded by water on three sides and connects with the mountain on one side.

Strongly influenced by the cold current from Siberia, it is cold with drought in winter and the average annual temperature is only −0.5℃, but the summer is mild and rainy; the temperature in July is 22.5 ℃ and the frost free period lasts 110 ~ 120 days, which is still enough to support plant life.

The Korean pine forest is a climax forest, that is to say, it is a community well adapted to its habitat with the ability to regenerate itself. The clearly layered forest holds a great variety of species. Korean pine is naturally the main species of this forest and its associated species of trees, shrubs and grasses in this community amount to some 500 including Korean spruce (*Picea koraiensis*), Yezo spruce (*Picea jezoensii* var. *microsperma*), dahurian larch (*Larix gmelinii*), amur linden (*Tilia amurensis*), ribbed birch (*Betula costata*), amur cork tree (*Phellodendron amurense*) and Korean poplar (*Populus koreana*).

Korean pine is a relic species with useful material of important values throughout the whole plant, i. e., its timber is light with strong resistance to erosion, splitting and twisting; the seeds possess 70% or more oil contents with high nutrient values; the pine gum in the trunk is the source of rosin and turpentine oil; and the needle is the material of pine needle oil used for the production

of superior quality of cosmetics.

The dense forest offers ideal habitats for many kinds of wildlife. There are 63 species of beast, 42 species of bird and 404 species of insect. The species composition includes sika deer (*Cervus nippon*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), wild boar and lynx (*Felis lynx*).

The reserve has a well – arranged administrative structure. Surrounding its central task of protecting the Korean pine forest ecosystem, special attention has been paid to fire control with modern techniques and facilities, e.g., a 40 m high fire observation tower equipped with high magnitude telescope and transceiver. As a result, no fire has occurred in the last 38 years. Collaborating with scientific institutes, the reserve has conducted scientific research focused on the ecology of the Korean pine forest. The projects include "GIS application in information management", "Prediction for forest fire" and "Planning and management of the reserve". The herbarium and the zoological specimen room as well as the exhibition room for pictures of natural landscapes have been used in education for improving public awareness of nature conservation and related laws and regulations.

A great potential to be tapped is tourism, because the reserve is a desirable place for research and vacations. The inauguration of ecotourism in the reserve was held in 1989, which attracted many scholars and tourists from at home and abroad. In short, the multiple functions of protection, scientific research, education and development continue to be the focus of the reserve's efforts.

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▲ 九寨沟诺日朗瀑布
Nuorilang Fall in Jiuzhaigou

▲ 五花海旅游
Touring at Five-flower Lakes.

▲ 九寨群海
Group of Lakes in Jiuzhaigou.

▲ 天水一方
Water meeting the sky

▲ 九寨沟民俗文化村
Folk custom and culture village in Jiuzhaigou.

九寨沟生物圈保护区

地理位置:四川省南坪县
面　　积:72 000hm^2
海　　拔:2 000～4 528m
保护对象:地质、地貌、自然景观及大熊猫等珍稀物种
建区时间:1978 年
晋升国家级自然保护区:1982 年
列入联合国教科文组织世界自然遗产目录:1992 年
纳入联合国教科文组织世界生物圈保护区网络:1997 年

九寨沟原名羊峒,又称翠海,因沟内有 9 个藏族村寨而得名。数千年来,九寨沟隐藏在川西北高原的崇山峻岭中,沧桑变迁全随自然,人类的活动在这里显得微不足道。沟内只有马道和山间小路,藏族人民过着自给自足的生活,与外界交往不多。而且由于山高地偏,交通闭塞,九寨沟一向鲜为人知。直至 1975 年人们才发现这里不仅蕴藏着丰富、珍贵的动植物资源,而且是世界上少有的优美风景区。随后正式建立了九寨沟自然保护区,从而揭开了九寨沟欣迎盛世的序幕。

九寨沟奇特的地貌形成、演化,经历了一个漫长而复杂的地质地貌作用过程。古老的地质构造奠定了现代地貌发育的基本格架和发展方向。第三纪以来喜马拉雅运动的兴起,塑造了九寨沟这样高斜面上缓倾的"Y"字型水系格局。从第四纪晚期更新世后,随着冰期气候的到来,高山上发育了冰川。海拔 2 800m 以下地区由于冰川未直接到达,被称为"活化石"的大熊猫(*Ailuropoda melanoleuca*)、箭竹(*Sinarundinaria* spp.)等孑遗生物保存下来。冰后期的气候适宜时期,在海拔 2 000～4 700m 的高寒范围内的山地和谷地,流水作用、生物作用、喀斯特作用得到了最旺盛的发展,垂直河流方向形成大小不等的钙华堤坝,堵塞水流形成湖泊或梯田状的海子群,水流的外溢下泻,形成高大的瀑布。从而使区内奇水荟萃,114 个翠海(高山湖泊),17 群瀑布,5 处滩流,47 眼泉水,11 段湍流,以 1 870m 的海拔高差,在 12 座雪峰之间穿林跨谷,珠连玉接,呈"Y"字形串珠,逶迤 50 余 km。湖泊与瀑布、溪流、河滩、山泉交错映衬,是九寨沟风光的又一特色。湖水终年碧蓝澄澈,明丽见底,而且随着光照变化、季节推移,呈现出不同的色调与风韵。九

九寨沟旅游示意图

Tourism Map of Jiuzhaigou

寨沟湖泊大多由乳白色钙华长堤分隔，堤埂蜿蜒曲折，其上花木丛生。一道道溪流，越堤出林，形成节奏明快的叠瀑，跌宕于群湖丛林，水至开阔处，形成被称为九寨乐园的珍珠滩及其珍珠滩瀑布，气势磅礴，格外壮观。

九寨沟地处青藏高原向四川盆地倾斜的过渡地带，各种地貌作用营力交错复合。现代喀斯特作用的钙华沉积形成的各种造形地貌，建造类型之复杂，结构组成成分之多样，景观类型之集中，在世界高寒喀斯特地貌中独树一帜。

九寨沟是多种自然要素交汇地区，为各种动植物提供了栖居繁衍的条件。这里有保存较好的天然林近 30 000hm^2，植被类型多样，垂直分布明显，植物区系成分复杂。据调查，有各类植物 2 500余种，其中有独叶草（*Kingdonia uniflora*）、星叶草（*Circaeaster argestis*）、箭竹等白垩纪、第三纪初的孑遗植物，有国家重点保护的二、三级植物白皮云杉（*Picea aurantiaca*）、岷江柏木（*Cupressus chengiana*）、领春木（*Euptelea pleiospermum*）等 7 种，还有 200 余种色彩斑斓的藻类植物，为九寨沟的湖海增添了不少魅力。区内有脊椎动物约 170 种，鸟类 140 余种，其中属国家一、二级保护动物大熊猫、金丝猴（*Rhinopithecus* spp.）、天鹅（*Cygnus* sp.）、鸳鸯（*Aiy galericulata* ）等 17 种。

具有多重身分的九寨沟，既是一处保持了原始、野趣自然风貌的旅游风景区，又是具有许多珍稀物种和地质地貌景观及其科学研究价值等多种功能的自然保护区，还是联合国教科文组织世界自然遗产地和世界生物圈保护区。其管理机构亦具有风景名胜区管理局和自然保护区管理处等多重职能。由于九寨沟特殊的旅游价值而名扬海内外，各地学者、游客纷至沓来。旅游业的兴起，既为九寨沟及其当地社区经济带来了活力，也使保护区管理者面临保护与发展如何协调的挑战。保护区针对肩负着保护自然资源本底、扶持当地居民脱贫致富的重任，确定了利用资源优势开展生态旅游的总目标。首先进行了旅游管理规划和区内居民的角色转变：使他们从管理对象变为九寨沟的主人，使阻力变为动力，使包袱变为财富，形成了保护区与当地社区共管、利益共享的关系。在此基础上，将区内集体、个人企业折价入股，实行统一管理。并将区内土地全部退耕还林，组织居民从事旅游服务和参与保护工作，使他们从中受益，走上致富之路，人均收入较 80 年代初增长 10 余倍。良好的旅游环境、巨大的经济效益和社会效益，当地居民自觉参与保护的主人翁意识，以及保护与持续发展和谐一致的生物圈保护区功能在九寨沟得以体现和深化。

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Jiuzhaigou Biosphere Reserve

Location: Nanping County, Sichuan Province
Area: 72 000 hm^2
Altitude: 2 000～4 528 m
Main objectives for protection: geological and geomorphological landscape, giant panda and other rare species
Established: 1978
National Nature Reserve designation: 1982
Listed in UNESCO the World Natural Heritage: 1992
UNESCO World Biosphere Reserve designation: 1997

Formerly "Cui Hai" (Green Lake), or "Yang Tong", Jiuzhaigou was later named for the nine (jiu in Chinese) Tibetan villages in the gullies. It was almost a virgin land hidden in the high mountains of the northwest Sichuan Plateau for thousands of years and the local Tibetan people lived a self-sufficient life, having little association with the external world except the narrow paths for travelling by horse. People outside did not have any knowledge of the rich biological resources of Jiuzhaigou until the year 1975, when it was simultaneously found to be a rare beauty in the world. And so the prologue of Jiuzhaigou's heyday was opened.

The ancient geological structure laid the basic frame of the present geomorphology and its evolution. It underwent a very long and complicated process of geologic and geomorphologic changes to have formed Jiuzhaigou's unique landform. When the Himalayan movement was on the upgrade after the Tertiary Period, the Y-shaped hydrographic network on the high slopes of Jiuzhaigou was formed. During the Pleistocene Epoch of the Quaternary Period, came the glacial period and the glaciers developed on high mountains. Luckily they did not reach the area lower than 2 800 m above sea level, so that some relic species like the "living fossil", giant panda (*Ailuropoda melanoleuca*) and China cane (*Sinarundinaria* spp.) could survive in this sanctuary. Under the suitable climate of the Postglacial Period, the water flowing action, biological action and Karstification developed exceptionally in high and cold mountains at elevations between 2 000～4 700 m. As time went on different sized limestone terraces were formed in

the vertical direction to the rivers. They blocked the flow of streams and rivers forming lakes or groups of terraced-shaped lakes. As limpid as crystal all the year the lakes present different colours and charms with the changing illumination and the alternating seasons. The streams overflow the blockages and run through forests forming overlapping waterfalls. When the water flows into an open area, the Pearl shoal falls and the Pearl shoals were formed.

Jiuzhaigou is a mosaic of various kinds of waterflow. There are 114 alpine lakes, 17 groups of waterfalls, 5 calcareous tufa shoals, 47 springs and 11 torrents, some of which have a drop of 1 870 m in elevation. They flow across 12 snow peaks sometimes like Y-shaped strings of pearls winding some 50 km away. The lakes, falls, streams, shoals and springs setting off one another is characteristic of Jiuzhaigou's beauty.

Jiuzhaigou lies in the transition where the Qinghai-Xizang Plateau decreases in elevation towards the Sichuan basin; various kinds of geomorphological forces crisscross within. The diverse mold-making land forms shaped by tufa deposition of modern Karst made it a singular style among the world's alpine-cold Karst geomorphologies, in terms of either the complexity of type, the structural composition, or the great diversity of landscapes.

Jiuzhaigou provides good habitats for numerous living creatures. It harbours 30 000 hm^2 of virgin forest, a variety of vegetation types with distinct vertical distribution and complex floristic composition. There are more than 2 500 higher plant species in the reserve. Among them seven are either the relics of the Cretaceous Period and Tertiary Period: one-flower kingdonia (*Kingdonia uniflora*), field circaeaster (*Circaeaster argostis*), China cane, or other classes of national protection, i. e., white bark spruce (*Picea aurantiaca*), Cheng cypress (*Cupressus chengiana*) and many-seeded euptelea (*Euptelea pleiospermum*). There are also 200 species or more of the colourful algae which add exceptional fascination to the lakes of Jiuzhaigou.

The reserve holds 140 odd species of birds and some 170 species of other vertebrates. 17 species of animals have been listed as the first and the second classes of national protection in the reserve, such as giant panda, golden monkey (*Rhinopithecus* spp.), swan (*Cygnus* sp.), mandarin duck (*Aiy galericulata*) etc.

Exerting important roles in many respects, Jiuzhaigou is an excellent scenic area of virgin and wild landscape. A multiple functioning Biosphere Reserve with many rare and precious species and spectacular geological and geomorphological

landscapes as well as strong Tibetan culture, all of which have significant scientific values, contribute to its designation as a World Heritage Site. The administrative authority integrated the roles of Administration Bureau of Jiuzhaigou (Scenery) and Administration Bureau of Natural Reserve. Special tourism value gives Jiuzhaigou a high reputation both in and out of China, attracting scientists and tourists to come in abundance. On the one hand tourism invigorates Jiuzhaigou and the local economy while it raises the challenge of balancing between protection and development on the other. Seeing that, the reserve has identified the general goal of using resource superiority to develop ecotourism so as to protect the overall natural resources and help the local people to lift themselves out of poverty and become well-off. Changes were first made in the design of tourism management and the role of local people in effective management. The participatory management with the sharing of benefits was finally established through tremendous efforts to change: from obstructive to motivated force, from burden to productive force and from being supervised to being masters of the scenic areas. A harmonious relationship between the reserve and the local people was thus formed.

Among a series of measures taken are: inclusion of the privately or collectively owned businesses into share capital with unified management; reforestation of all the lands in the reserve previously used for other purposes; and organization of the residents to serve tourism or participate in protection work with the benefit thereof. As a result, the per capita income increased over 10 fold from that in the 1980s.

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