



EABRN Biosphere Reserve Atlas
People's Republic of China

东亚生物圈保护区地图集 中国卷

East Asian Biosphere Reserve Network(EABRN)
UNESCO-MAB Programme

联合国教科文人与生物圈计划
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FOREWORD

The atlas is a fascinating information carrier which provides an international (geo)graphical language reflecting the temporal and spatial characteristics and changes of the earth system. Biosphere reserves are sites recognized under UNESCO's Man and the Biosphere (MAB) Programme, which innovate and demonstrate new approaches to conservation and sustainable development. The reserves are, of course, under national sovereign jurisdiction, yet share their experience and ideas nationally, regionally and internationally within the World Network of Biosphere Reserves (WNBR).

The work of the MAB Programme over the years has concentrated on the development of the WNBR. The biosphere reserve concept was developed initially in 1974 and was substantially revised in 1995 with the adoption by the UNESCO General Conference of the Statutory Framework and the Seville Strategy for Biosphere Reserves.

Today, with more than 480 sites in over 100 countries, the WNBR provides context-specific opportunities to combine scientific knowledge and governance modalities to reduce biodiversity loss, improve livelihoods, and enhance social, economic and cultural conditions for environmental sustainability, thus contributing to the pursuit of the Millennium Development Goals, in particular to Goal 7 on environmental sustainability.

Biodiversity's fundamental value is neither aesthetic nor economic but environmental, even though most people are largely unaware of this. The value of biodiversity is often measured in terms of the number of species living in a given area. But the interactions between the many species in an ecosystem, and between them and the environment's physical and chemical components are also very important. Biosphere reserves serve as learning and demonstration sites in the framework of the United Nations Decade of Education for Sustainable Development. With this context in mind, under the East Asian Biosphere Reserve Network (EABRN), UNESCO is producing a Biosphere Reserve Atlas for the general public as well as for school children to create and promote the awareness of the concept of biosphere reserves.

This atlas for China is the first in the EABRN atlas series and will be followed by atlases for other member countries of EABRN. It is our hope that this atlas will serve as an eye opener to using biosphere reserves as a learning tool for education for sustainable development. It is with great anticipation that we hope this atlas will serve to inform and guide school children as well as the general public to gain knowledge about nature and ecology. In addition we hope that it will also foster students' skills, attitudes and values to be conducive to sustainable development.

Prof. Dr. Walter R. Erdelen
Assistant Director-General for Natural Sciences
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序

地图集作为一种信息载体，提供了一个能够表现时间和空间特性以及地球体系演变的国际化的地理图画语言。由联合国教科文人与生物圈计划认可的生物圈保护区旨在开创和展示新的保护和使生物圈可持续发展的方法。各国当然对生物圈拥有完全的主权，同时在世界生物圈保护区网络下他们也可以在各自的国家和区域内以及国际间分享他们的经验和思想。

多年来，人与生物圈计划的工作主要集中在发展世界生物圈保护区网络方面。生物圈保护区的概念是于1974年提出的，并于1995年随着在联合国教科文组织大会上决议通过的生物圈保护区法定框架和塞尔维亚纲要的采用而得已充分修订。

今天，世界生物圈保护区网络拥有480多个保护区网点，遍布100多个国家。它为科学知识和管理模式的结合提供了切实的机会从而致力于：减少生物多样性的损失、改善生计、增强为环境可持续的社会、经济和文化环境，进而为联合国千年发展目标做贡献，尤其是千年发展目标的第七条环境的可持续发展。

生物多样性的基本价值既不是美学上的，也不是经济上的，而是环境上的，虽然大多数人还远没有意识到这一点。生物多样性的价值通常是根据生活在一个指定地方的物种的数量来测量的。但是生态系统中物种间的相互关系及他们和环境物理和化学成分相互关系也是非常重要的。

生物圈保护区是联合国可持续发展教育十年计划的学习和示范点。在这个思想下，联合国教科文组织在东亚生物圈保护区网络的框架下正在制作为普通大众和学校的孩子们提供的生物圈保护区地图来激发并促进人们对生物圈保护区概念的了解。

中国将会是东亚生物圈保护区网络中第一个完成地图集的，并且东亚生物圈保护区网络中的其它国家都将会效仿中国。这个地图集将通过把生物圈保护区作为对可持续发展进行教育的学习工具而使人们大开眼界。我们希望这个地图集可以给予并指导学校的孩子们和普通公众在自然和生态方面的知识。另外，我们希望它能够培养学生们的有益于可持续发展的技能、态度和价值观。

Prof. Dr. Walter R. Erdelen
自然科学助理总干事
联合国教科文组织



PREFACE

“The basis for good planning and management is good information” .

Maps, as a visual language in regional science, have become more and more demonstrative for their peculiar superiority and widely-ranged potential application with the advancement of modern science and technology.

The present EABRN Atlas for China is a follow up of the recommendation from the 9th EABRN ad-hoc committee meeting held during August–September 2005 in Jeju Island, Republic of Korea. Shared among the members of the EABRN was a strong desire for information exchanging at the regional level, which in turn led to the designing of an Atlas to represent and illustrate the Biosphere Reserves in each member country. It was also agreed that a common Atlas should be produced in order to popularise and inform the general public about the Biosphere Reserve concept, in particular to school children.

The preparation of the Atlas is being carried out in a phased manner subject to the availability of funds. The EABRN Secretariat shall prepare the detailed plan. During the first phase, it was decided to carry out EABRN Atlas for China and Mongolia and this Atlas for China is the first one in the series.

The designation of a biosphere reserve is not only a recognition of significant natural values, but represents a commitment on the part of government agencies at all levels and all local interests to create living examples of conservation and sustainable development.

The main objectives of this atlas are:

- ✓ to transform complex data into easily readable information for the general public and school children, and
- ✓ to increase the knowledge of teachers, school students and community on Biosphere Reserve Sites (BRs) under the World Biosphere Reserve Network (WBRN)

within the context of sustainable development, stressing the importance and components of BRs and ecosystems.

China embraces various ecosystems, mainly including forests, meadows, steppes, deserts, marshes, freshwater and marine ecosystems; these represent almost all of the important types of ecosystems in the world. It is internationally considered that China is one of the mega diversity countries in the world, where the number of species, as a whole, make up more than one tenth of the total number of species in the world. The Central Government and the public have made great efforts for the conservation and sustainable use of biodiversity, resulting in remarkable achievements. Environmental conservation has been adopted as one of the basic policies of the government. Even though great efforts have been made for the conservation and sustainable use of biodiversity in China, the situation is still quite serious. Owing to historical reasons, which led to rapid population increase and the development of industries, biodiversity in China is suffering a catastrophic decline and is still subject to serious destruction such as decrease of forestry area, deterioration of grassland, drought of wetlands, destruction of coral reef etc. With this context Chinese MAB Committee is committed to support this initiative and started the preparation work by selecting four representative BRs with specific ecosystems.

We would like to thank the Chinese MAB Committee for its readiness in sharing the available information and to be the first testing ground as a model and example Atlas for other EABRN members. The appreciation would also go to all members of the EABRN countries for agreeing to share their available data in order to produce the EABRN BRs Atlas series.

Thanks must also go to Mr. Natarajan Ishwaran, Director of Ecological and Earth Sciences Division, UNESCO Paris, Mr. Thomas Schaaf, Programme Specialist and MAB Asia Pacific coordinator and Mr. Han Qunli, Senior Programme Specialist Ecological Sciences, UNESCO Regional Bureau for Science, who provided the technical support and coordination throughout this initiative.

Finally, yet importantly, we would like to thank the Korean National Commission for UNESCO, Government of Republic of Korea, for their generous financial support to EABRN network and its activities, without which this Atlas would not have been possible.

Yasuyuki Aoshima
Director, UNESCO Office Beijing
Ramasamy Jayakumar
Programme Specialist-Science, UNESCO Office Beijing

前言

好的计划和管理的基础是有好的信息。

地图作为一种在地域科学中的可视语言，已经变得越来越具有特殊的优越性，并随着现代科技的进步具有越来越广泛的应用潜力。

现在的东亚生物圈保护区网络生物圈保护区的地图集是2005年8-9月在韩国济州岛召开的第9届东亚生物圈保护区网络特别委员会会议建议之后的跟进工作。东亚生物圈保护区网络中的成员区域内的信息共享是大家的强烈愿望，这就是设计地图集来描绘和说明各个国家的生物圈保护区的原因。人们同样认为应该制作一个地图集来向普通大众和在校学生普及生物圈保护区的概念。

地图集的准备根据资金的情况可以分为几个阶段。东亚生物圈保护区秘书处会制定详细的计划。在第一个阶段，已经决定要先作出中国和蒙古的生物圈保护区地图，并且这个地图是这一系列地图中的第一个。

生物圈保护区的指定不仅是对重要自然价值的认可，还代表着对政府机构的承诺，这些承诺为所有级别的政府机构和所有地方利益相关者创造了保护和可持续发展的生动范例。

这本地图集的主要目标是：

将复杂的数据转变成针对普通大众和在校学生的简单易读的信息。

增加老师、学校学生和团体在世界生物圈保护区网络框架下的生物圈保护区的知识。在可持续发展中，强调其重要性和生物圈保护区的构成和生态系统。

中国拥有丰富的生态系统，主要包括森林、草地、草原、沙漠、沼泽，及海洋生态系统，这些几乎代表了世界上所有重要的生态系统。中国被认为是世界上具有多样性的国家，拥有大量的物种，占世界总物种的1/10。中央政府和公众已经为生物多样性的保护和可持续发展做出了很大的努力，并取得了很大的成就。环境保护被作为政府的基础政策而采用。在中国，即使已经为生物多样性的保护和可持续发展做出了很大的努力，形势仍然比较严峻。由于人口迅速增长和工业发展的历史原因，中国的生物多样化正在遭受灾难性的减少，并且仍然在遭受严重的破坏，例如森林面积的减少，草原被破坏，土壤的干旱，珊瑚礁被破坏等。中国人与生物圈计划委员会非常支持这一举措并选择四个具有特殊生态系统的生物圈保护区作为代表开始了地图集的准备。

我们应该感谢中国人与生物圈计划委员会，因为他们为分享已有信息做好了准备并且将成为第一个为东亚生物圈保护区网络其他成员制作地图集的范例和试验地。感谢也将会传达到东亚生物圈保护区网络的所有成员中，感谢他们分享他们的现有资料来制作东亚生物圈保护区网络的生物圈保护区系列地图集。也必须感谢生态和地球科学部门的主管，联合国教科文组织巴黎的Natarajan

Ishwaran先生，项目官员和人与生物圈计划亚太区协调员Thomas Schaaf先生，和联合国教科文组织地区科学办公室的高级生态科学项目官员韩群力先生，他们提供了技术上的支持并在整个过程中积极协作。

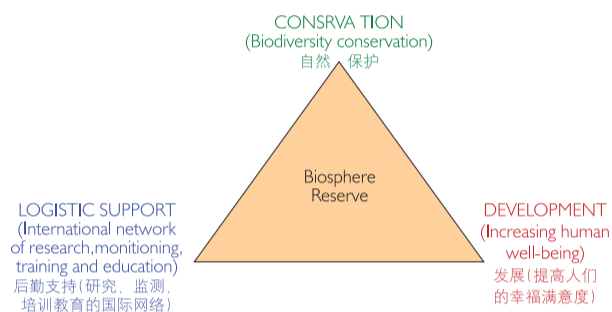
最后，非常重要的一点是，我们要感谢韩国联合国教科文全国委员会为东亚生物圈保护区网络及其活动提供的慷慨支持，没有他们的资助，这本地图集就无法完成。

联合国教科文组织北京代表处代表
青岛泰之
联合国教科文组织北京代表处科学与环境项目官员
贾古玛

Biosphere Reserve an Introduction: In the face of the rapid disappearance of biodiversity, scientists, governments and nature conservation associations reacted with the creation of a network of protected areas called Biosphere Reserves. Often conservation can only be achieved by involving the local populations who are the main users of an area's natural resources and have the greatest impact on the surrounding environment.

The origin of Biosphere Reserves goes back to the "Biosphere Conference" organized by UNESCO in 1968, the first inter-governmental conference to seek the reconciliation between the conservation and the use of natural resources, which foreshadowed the present-day notion of sustainable development. The World Network is formally constituted by a Statutory Framework, which was resulted from the work of the International Conference on Biosphere Reserves, held in Seville (Spain), in March 1995. This Statutory Framework sets out "the rules of the game" of the World Network and foresees a periodic review of biosphere reserves. Activities of the World Network are guided by the "Seville Strategy for Biosphere Reserves", also drawn up at the Seville Conference.

Functions of Biosphere Reserves: Biosphere reserves have three main functions: biodiversity conservation, economic and social development and logistic support. Each function supports the others.



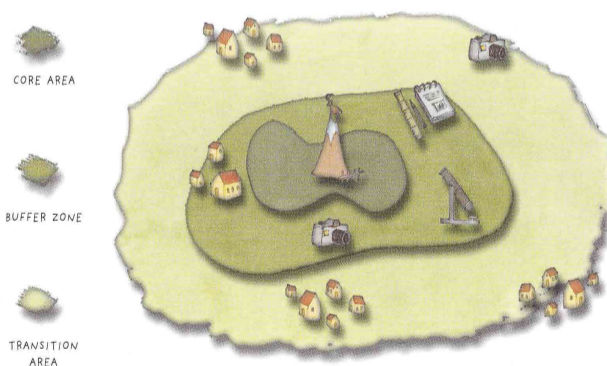
The first function, conservation, contributes to the global movement to protect samples of Earth's wealth of plants and animals and the ecosystems that they form. The second function, development, seeks to encourage economic and social development that does not destroy nature's resources and is adapted to the culture and traditions of the local communities. The last function, logistic support, refers to the role that biosphere reserves play both open-air laboratories for scientific research and cataloguing biological diversity. It also refers to their role as open-air classrooms for teaching people about major environmental and development problems and how the problems can be resolved.

In order to fulfil their three functions, biosphere reserves are laid out in three interdependent zones: a core area, a buffer zone, and a transition area.

The core areas are often strict nature reserves or the most highly protected parts of the national parks. The core area may contain a large number of plant and animal species. Only fundamental scientific research is allowed in this area and the core area benefits from long-term legal protection under national law.

The buffer zone surrounds core area or next to it. This zone can be a place for experimental research, facilities for education, training, tourism and leisure may also be found. The boundaries of this zone often coincide with those of a national park; this zone can be used for activities without disturbing the core area.

The transition area forms outer part of the biosphere reserve. It may also be called as the area of cooperation. The human settlements are allowed in this zone. Regional social and economical development of the biosphere reserve mainly depends on this zone.



Biosphere Reserves form a World Network that enables the sharing of information on the conservation and management of ecosystems inhabited by humans, animals and plants. Since the first Biosphere Reserves were selected in 1976, the World Network continued to grow. Today, with more than 480 sites in over 100 countries, the WNBR provides context-specific opportunities to combine scientific knowledge and governance modalities to:

- * Reduce biodiversity loss
- * Improve livelihoods
- * Enhance social, economic and cultural conditions for environmental sustainability
- * Thus contributing to the pursuit of the Millennium Development Goals, in particular MDG 7 on environmental sustainability

Biosphere reserves can also serve as learning and demonstration sites in the framework of the United Nations Decade of Education for Sustainable Development (DESD).

生物圈保护区介绍:

面临着生物多样性的不断缺失, 科学家们、政府部门以及自然保护联盟等机构共同倡议创立一个自然保护区的网络, 这些自然保护区被称为生物圈保护区。通常这样的保护只有通过当地社区群众的参与才能够得以实现, 因为他们是一个地区自然资源的主要使用者并且他们对周边环境具有最深刻的影响。

生物圈保护区的起源要追溯到1968年由联合国教科文组织举办的“生物圈大会”, 这是第一次寻求保护与自然资源使用之间和谐关系的政府间大会, 预示了现今所提倡的可持续发展的理念。世界网络由1995年3月在塞维利亚(西班牙)召开的生物圈保护区国际大会所形成的法定框架正式构成。这个法定框架确立了世界网络的“游戏规则”并预见到了生物圈保护区的定期回顾。世界网络在塞维利亚大会起草的“生物圈保护区塞维利亚战略”的指导下行动。

生物圈保护区的功能: 生物圈保护区有三个主要功能: 保护生物多样性, 经济和社会发展以及后勤支持, 各个功能都是相互支持的。

第一个功能: 保护, 致力于保护地球丰富的动植物资源和它们所构成的生态系统的全球行动。第二个功能: 发展, 在不毁坏自然资源和适应于当地社区的文化和传统的条件下寻求经济和社会的发展。最后一项功能: 后勤支持, 是指生物圈保护区在科学研究和记录生物多样性方面扮演的“开放式实验室”的角色。它还包括生物圈保护区在教导人们关于环境和发展的以及如何解决这些问题等方面所扮演的“生动课堂”的角色。

为了履行上述三项功能: 生物圈保护区被划分为三个独立的区域: 核心区, 缓冲区和过渡区。

核心区通常是严格的自然保护区或是国家公园内受到最高保护的部分。核心区内可能有大量的植物和动物种群。在这个区域内, 只有最基础的科学研究是被允许的, 并且核心区受益于国家法律的长期法律保护。

缓冲区环绕着核心区或者是与核心区毗邻。这一区域可以作为实验研究的场所, 教育设施, 培训, 旅游和休闲都可以在这一区域进行。这一区域的边界通常和国家公园的边界重合, 在这一区域内可以进行一些不干扰核心区的活动。

过渡区构成了生物圈保护区的最外部。它也可以被称为合作区。这一区域内可以允许人类居住。生物圈保护区的区域社会经济发展主要依赖于这一区域。

生物圈保护区形成了一个世界网络来促进保护和由人类以及动植物构成的生态系统管理的信息共享。自1976年第一批生物圈保护区成立以来, 世界网络不断发展。今天, 世界生物圈保护区网络在100多个国家有超过480个成员, 它提供了将科学知识和管理特征结合起来的机会从而:

- * 减少生物多样性缺失
 - * 提高生活水平
 - * 提升环境可持续发展的社会经济和文化条件
 - * 进而贡献与千年发展目标的实现, 尤其是千年目标第七条关于环境的可持续发展
- 生物圈保护区还可以作为联合国可持续发展教育十年计划的学习和示范场所。



Group Photo of EABRN-9 Meeting at Jeju Island Biosphere Reserve, ROK 29 August-3 September 2005
在韩国济州岛生物圈保护区召开的东亚生物圈保护区网络第九次会议开幕式集体合影(2005年8月30日至9月3日)

EABRN an Introduction: The Twenty Seventh (1993) General Conference of UNESCO, adopted the draft resolution proposed by the Republic of Korea, and called upon UNESCO Member States of Asia Pacific to strengthen cooperation in the implementation of the Action Plan for Biosphere Reserves. In response to the General Conference invitation, a Cooperative Scientific Study of East Asian Biosphere Reserves was launched by East Asian Member States in 1994, namely the Democratic People's Republic of Korea (DPRK), Japan, Mongolia, People's Republic of China (PR China) and the Republic of Korea (ROK) in Cooperation with the UNESCO Offices in Jakarta and Beijing and Man and the Biosphere (MAB) Programme Secretariat at UNESCO, Paris. During 1998, with an official request from MAB Committee of Russian Federation to be part of this network, Russia was also included after the approval of EABRN member states.

Since from the inception of the EABRN, its secretariat was functioning at UNESCO Office Jakarta, with the process of decentralization and reforms, the secretariat moved to UNESCO Office Beijing in 2003. UNESCO Beijing Office, as the secretariat, has strengthened its activities for EABRN. UNESCO Jakarta Office, as the Regional Science Bureau for Asia and Pacific, and MAB Secretariat, Paris global coordinator of World Biosphere Reserve Network provided strong and continuous support. EABRN facilitates exchange and transfer of information between reserves and governing bodies. It also serves as a mechanism to facilitate training and site-to-site cooperation, and conducts regular regional meetings on various issues.

During the 9th Meeting of UNESCO East Asian Biosphere Reserve Network (EABRN) at Jeju Island Biosphere Reserve, Republic of Korea, 30th August to 3 September 2005 the members from the MAB National Committees convened an ad-Hoc Committee meeting and decided to generate a common atlas for popularizing the BR concept for the general public and at the level of school children. The Atlas will be published in six volume: one for each EABRN Member States and it will be bilingual (English and official language of the country) in its entirety.

东亚生物圈保护区网络介绍: 1993年召开的联合国教科文组织第二十七届大会, 采纳了大韩民国提出的决议草案并号召联合国教科文组织亚太地区成员国加强生物圈保护区行动计划实施的合作。作为对大会邀请的回应, 1994年期间, 由东亚成员国(朝鲜民主主义共和国、日本、蒙古国、中华人民共和国、大韩民国)协同联合国教科文组织雅加达代表处、北京代表处、联合国教科文组织人与生物圈计划巴黎秘书处启动了东亚生物圈保护区的合作性科学研究。1998年期间, 经东亚生物圈保护区各成员国批准, 俄罗斯联邦人与生物圈委员会正式被纳入东亚生物圈网络。

东亚生物圈保护区网络秘书处最初设立在联合国教科文组织雅加达代表处, 分散管理及重组后, 秘书处于2003年迁至北京。联合国教科文组织北京代表处, 是加强东亚生物圈网络活动的秘书机构; 而联合国教科文组织雅加达代表处(教科文组织亚太地区科学办公室)和人与生物圈计划巴黎秘书处(世界生物圈网络的全球协调机构)也为东亚生物圈保护区网络提供了持续有力的支持。东亚生物圈网络致力于推进保护区与政府机构间的信息交流与传递, 同时也是服务于培训、网络成员间的合作及定期组织各类会议的职能机构。

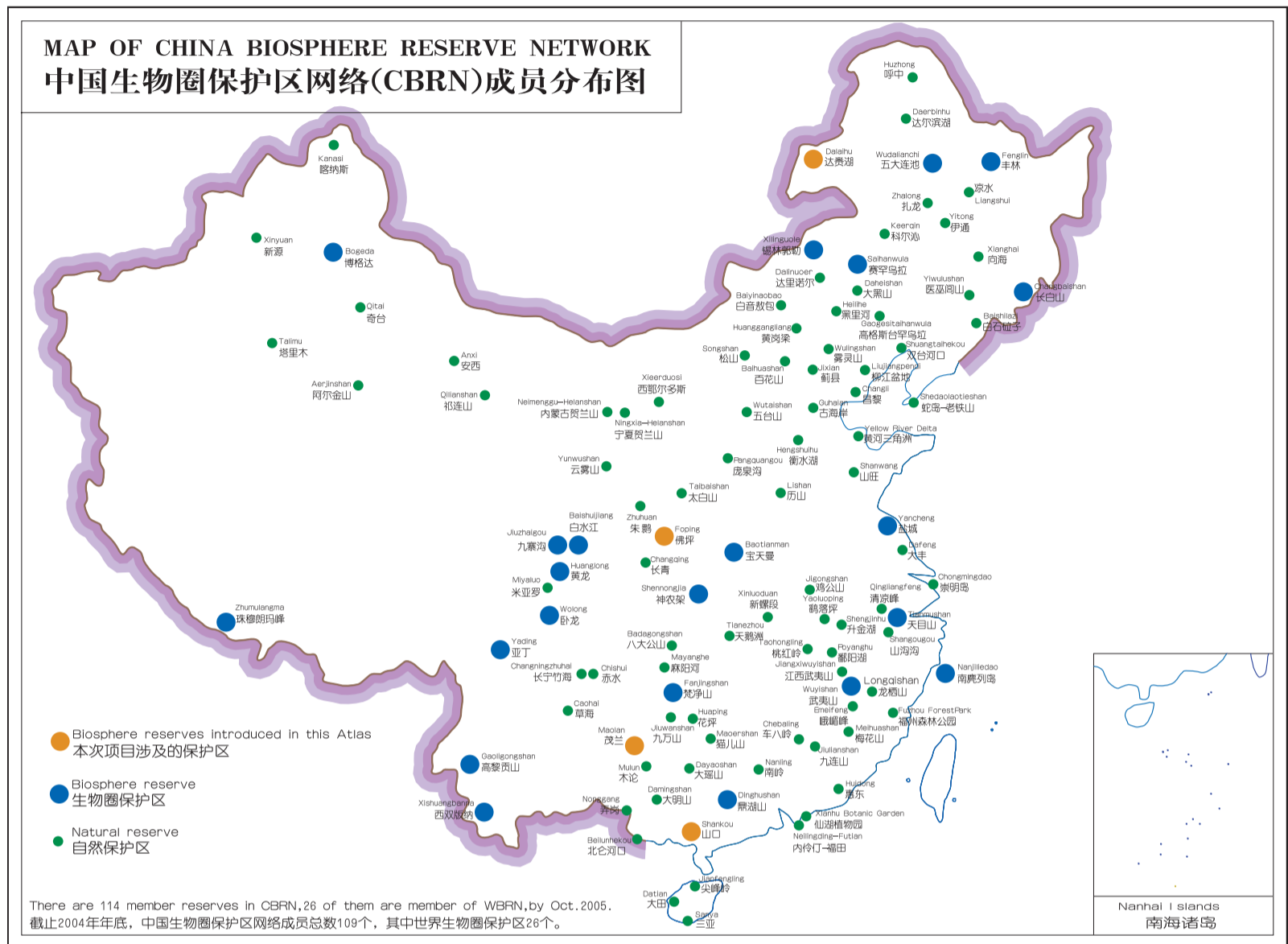
2005年8月30日-9月3日, 在韩国济州岛生物圈保护区召开的第九届联合国教科文组织东亚生物圈保护区网络会议上, 各成员国人与生物圈国家委员会召集了一个特别委员会会议, 决定出版一本针对在校学生地图集, 用以普及生物圈保护区理念。地图集将出版六卷, 每个东亚生物圈保护区成员国一卷, 全部采用双语(成员国官方语言和英语)。



Group Photo of field trip at Mt. Halla, EABRN-9 Meeting
东亚生物圈保护区网络第九次会议汉拿山实地考察集体合影

Chinese National Committee for MAB and China Biosphere Reserve Network (CBRN) an Introduction

中国人与生物圈国家委员会和中国生物圈保护区网络



In 1971, cooperated with many multidisciplinary organizations, UNESCO launched the MAB (Man and Biosphere Programme), an international & intergovernmental cooperation and training programme. China became the member state of MAB Programme in 1973. Officially under the approval of the State Council, the Chinese National Committee for MAB was established in 1978, and it is composed of 48 representatives from government agencies, prominent scientists, press circles as well as scientific societies. Within the framework of Chinese Academy of Sciences, 5 full-time staffs of Chinese National Committee for MAB office take in charge of the routine works including: defining the priority areas of MAB Programme, organizing the implementation of the programme and providing the guidance as well as consulting for the government policy making.

Biosphere Reserves are the vital implementation sites established under UNESCO's MAB Programme. Since the establishment of the first sites worldwide in 1976 by September of 2005, there have been 482 Biosphere Reserves built in 102 countries within the framework of the World Network of Biosphere Reserves (WBRN). The Chinese National Committee for MAB set up the China Biosphere Reserve Network (CBRN) in 1993, the membership had increased to 119 BRs by 2005, and 26 of them were accepted as the member of WBRN. (This atlas includes information of 4 members of WBRN in China: Dalai Lake BR, Maolan BR, Foping BR, Shangkou Mangrove BR).

The Chinese National Committee for MAB progressed and developed its work by promoting BR concept, facilitating the international exchange, implementing the training for the BR's managers as well as organizing the communication across the different sections. The specific works of Chinese National Committee for MAB with its CBRN are as follows:

1. International Cooperation

* Five countries in East Asia convened the second meeting in the Changbai Mountain Reserve and established EABRN in 1994;

* China's Dalai Lake Reserve established a trans-boundary Protected Area with Mongolia and Russia in 1994;

* EABRN-9 Conference was held in 2005;

*

2. Special topics trainings with intelligence input and on-site Evaluation

* Management training of grassland type reserves was held in Xilingol Reserve, (Inner Mongolia in 1994);

* Management workshop of marine type reserves was held in Beihai (Guangxi province in 2001);

* Raise the suggestions through a Round-table discussion and evaluation involving representatives from reserves and experts by selecting outstanding and common problems encountered in reserve management based on the on-site survey;

> Evaluation of Shennongjia Reserve (Hubei province 1994);

Evaluation of Dinghu Mountain Reserve (Guangdong province 1996);

*

1971年, 联合国教科文组织在其他组织的配合下, 开始实施人与生物圈计划。中国于1973年参加这一项国际性、政府间的合作及培训计划并当选为理事国, 并于1978年成立了中华人民共和国人与生物圈国家委员会。委员会由相关政府部门官员、知名科学家、新闻团体以及学术团体的48名代表组成。中国MAB秘书处设在中国科学院, 由5名专职人员负责日常工作。其主要职责是确定人与生物圈计划在中国的优先领域, 并组织实施和提供指导, 以及为政府提供政策咨询。

生物圈保护区是在联合国教科文组织人与生物圈计划下建立的最重要的实施基地。自1976年世界范围建立第一批生物圈保护区以来, 至2005年9月, 已在102个国家建立482个生物圈保护区, 形成了世界生物圈保护区网络(WBRN)。中国人与生物圈国家委员会自1993年建立了中国生物圈网络(CBRN), 至2005年, 119个网络成员包括了全国各种类型的自然保护区, 其中26个为世界生物圈保护区网络成员。(本册地图集介绍了达赉湖生物圈保护区、茂兰生物圈保护区、佛坪生物圈保护区和山口红树林生物圈保护区)。

从推广生物圈保护区理念、促进国际间交流, 到对生物圈保护区管理者最实质的培训与支持以及跨部门交流的促成, 委员会工作的进步与发展清晰可见。中国人与生物圈国家委员会通过CBRN的工作主要包括:

1. 国际间合作:

* 东亚5国长白山第二次会议, 东亚生物圈保护区网络建立EABRN (1994);

* 达赉湖保护区与蒙俄建立跨界保护区而举行的三国代表会议。(1994);

* 第九届东亚生物圈保护区网络大会 (EABRN-9) (2005);

*

2. 以智力投入为核心的专题培训与现场评估

* 草地类型保护区管理培训 (内蒙古锡林郭勒保护区, 1994);

* 海洋类型保护区管理培训 (广西北海, 2001);

* 选取保护区管理中突出的和共性的问题为评估题目, 在现场考察的基础上, 以专家、保护区取代表组成的圆桌式讨论对该保护区提出评估建议。

> 神农架保护区评估 (湖北 1994);

> 鼎湖山保护区现场评估 (广东 1996)



Chinese National Committee for MAB and China Biosphere Reserve Network (CBRN) an Introduction

中国人与生物圈国家委员会和中国生物圈保护区网络



3 Promote the application of GIS (Geographic Information Systems), which is an effective solution of spatial data processing:

- * Status analysis and management of wildlife habitats,
- * Zoning;
- * Eco-tourism planning;
- * Fire prevention system planning and implementation

4. Eco-tourism a balance between conservation and development.

* Discuss and implement the eco-tourism project at a potential point of integrating bio-diversity protection, local economic development, community participation, public education and the funding of a reserve itself;

* Improve the understanding and knowledge of eco-tourism to the public by strategic research and case study, training , evaluation and publications;

* Continue to improve the "soft input" by standardizing of eco-tourism management and increasing research, training and information sharing etc..

5. " A series of MAB popular science activities " aimed at public education:

* First nature reserve public education symposium (Shenzhen , 2002);

* Inner Mongolian grassland ecological culture photographic exhibition held in collaboration with Friends of Nature (Beijing and Inner Mongolian, 2003);

* "Experience & Dialogue" - first face to face communication among representatives of Dalai lake reserve, local community and citizen of Beijing (Beijing, 2005);

*

6. Policy Study and Consulting

* BR is a new-module of arrangement and establishment to break through and reform the existing system;

* General study at the national level and case study at the site level aim to provide consulting and suggestion to the policy makers and managers;

* Sustainable management of BR is the key of policy study;

7. Introduce, disseminate and promote the international conservation concepts and trends through publications of popular science and information exchange

* Previous Chinese Biosphere Reserves magazine in early years (Quarterly)

* China-MAB Newsletter among BR members (in Chinese and English)

* Man and the Biosphere the only popular since magazine with introductions of BR, knowledge of natural science, promotion of public participation, service and guidance information of enjoying the nature to the readers (Bi-monthly)

* Other publications that are not printed on regular basis.

* CBRN Web site.

The Chinese national committee for MAB with its CBRN had paid great efforts to develop themselves and pushed forward the establishment and growth of EABRN while widening the international communication and cooperation. And it will continue to explore and contribute with untiring endeavors to the harmony of man & nature and sustainable use of natural resources.

Main member organizations:

Chinese National Commission for UNESCO, Ministry of Science and Technology, Ministry of Finance, Ministry of Land and Resources, Ministry of Agriculture, Ministry of Construction, Ministry of Water Resources, State Environmental Protection Administration, State Forestry Administration, State Oceanic Administration, China Association for Science and Technology, Chinese Academy of Sciences, Chinese Academy of Social Sciences, China Institute of Water Resources and Hydropower Research, Peking University , Beijing Normal University , Beijing Agricultural University, China Wildlife Conservation Association, China National Science Commission for Endangered Species, China Tourism Association, Friends of Nature, Xinhua News Agency, China Central People's Broadcasting Station and Biosphere Reserves .

3. 推广具有综合处理空间信息能力的地理信息系统 (GIS) , 应用涉及:

- * 野生动物栖息地的状况分析和管理工作;
- * 功能区划分;
- * 生态旅游规划;
- * 防火体系布设等

4. 兼顾保护与发展的生态旅游

* 抓住生物多样性、当地经济发展、社区参与、公众教育及保护区自身经费来源的结合点, 探讨及尝试保护区生态旅游项目;

* 通过总体研究、案例分析、培训、评估、出版等方式的多元结合提高人们对生态旅游的理解和认识;

* 进一步推动生态旅游规范化管理及增加研究、培训和信息分享等方面的“软投入”

5. 以公众教育为目的“人与生物圈系列科普活动”

- * 首次召开的自然保护区公众教育研讨会 (深圳, 2000) ;
- * 与“自然之友”联合举办的内蒙草原生态文化摄影展 (2003) ;
- * 体验与对话—达赉湖保护区代表、当地社区百姓以及城市人的首次直面交流 (北京, 2005) ;

*

6. 管理政策研究

* 生物圈保护区是突破和改革现有制度的一种新型制度的安排和建立;

* 国家层次的总体研究和保护区层次的案例研究, 目的是为决策者和管理者提供政策咨询和建议;

* 研究的重点是针对保护区的可持续管理

7. 通过提供信息交流和科普的出版物介绍、传播、推广国际上有关保护的理念和动向:

- * 早期的《人与生物圈保护区》(季刊) ;
- * 网络成员内部交流的《人与生物圈通讯》(中英文版) ;
- * 介绍保护区、提供自然知识, 提高公众参与度、向读者体验自然提供信息与服务的科普杂志和生物圈理念的公众读本《人与生物圈》(双月刊);
- * 其他不定期出版物;
- * 建设和完善“中国生物圈保护区网络”网站

中国生物圈保护区国家委员会针对CBRN开展的众多工作, 促进了中国生物圈保护区自身的发展, 同时通过扩大国际间的交流合作, 也促进了东亚地区生物圈保护区 (EABRN) 的建立与发展, 在探索人与自然和谐相处与自然资源科学开发利用的道路上, 中国人与生物圈国家委员会仍将上下求索, 努力不懈。

主要成员单位包括:

中国教科文组织全国委员会、国家科学技术部、财政部、国土资源部、农业部、建设部、水利部、国家环保总局、国家林业局、国家海洋局、中国科学技术协会、中国科学院、中国社会科学院、中国水利科学院、北京大学、北京师范大学、北京农业大学、中国野生动物保护协会、国家濒危物种科学委员会、中国旅游协会、自然之友、新华通讯社、中央人民广播电台、生物圈保护区等

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韩念勇先生

Note 1 Main contents of the MAB Programme:

- * Study the interaction between human and environment by using ecological methodologies;
- * Provide a scientific basis for the conservation of ecosystems and proper use of resources and ecosystems through multi-disciplinary and comprehensive research;
- * Study the impact of human activities on the biosphere through long-term systematic monitoring
- * Provide training and promote information exchange and build the capacity to achieve effective management of natural resources in Biosphere Reserves.

小贴士一 人与生物圈计划的主要内容:

- * 是用生态学的方法研究人与环境之间的关系;
- * 通过综合的多学科研究, 提供生态系统保护及资源合理利用的科学依据;
- * 通过长期的系统检测研究人类对生物圈的影响;
- * 为提高生物圈自然资源有效管理而开展培训和信息交流

Note 2: The Core Goal of CBRN: To design and launch new projects based on specific problems arisen with the management of Nature Reserves.

The Main Functions of CBRN:

- * Promote exchanges between Chinese Nature Reserves and their forging counterparts by serving as an international cooperation channel;
- * Help to improve the management quality of Nature Reserves through exchanges of knowledge, concepts and experiences;
- * Provide a platform for multi-lateral exchanges between Nature Reserves under the jurisdiction of different government agencies.

小贴士二 中国生物圈自然保护区的核心宗旨:

- 针对自然保护区管理一线遇到的实际问题设计和启动项目, 中国生物圈保护区网络 (CBRN) 的具体功能:
- * 作为国际间合作渠道, 促进我国自然保护区与国际上的交往;
- * 提供“软投入”, 通过知识、理念和经验的交流, 提高自然保护区的管理质量和水平;
- * 为不同部门所管辖的自然保护区提供横向交流的平台

The Dalai Lake, one of the UNESCO Man & Biosphere Nature Reserves, is located between North Latitude 47° 45' 50" - 49° 20' 20" and East Longitude 116° 50' 10" - 118° 10' 10". Bordering Russia in north and Mongolia in south, the reserve has a total area of 7,400 square km, of which wetland accounts for 44%. As the "paradise" for migratory birds, the grassland remains 55% of the reserve while it is the best-preserved natural grassland of the world. Dalai Lake Nature Reserve was established in 1986 and was approved as one of China's National Level Nature Reserves in 1992, and was included into China, Mongolia, Russia - CMR ("DAURIA" International Protected Area) in 1994. In 2002 it was listed as one of the world International Important Wetlands, and was selected as a member of the UNESCO Man & Biosphere Nature Reserve network. As a reserve for endangered birds and the natural environment they depend on, Dalai Lake has a vast area of water and wetlands that provide abundant feed as well as being a "post house" for migratory birds on their long journal from Oceania to north-east Asia. Because of the similarity between the natural environments and species in that area, China, Mongolia and Russia reached to a consensus to jointly protect the three national-level nature reserves of each country, the Dalai Lake Reserve in China, "Daurisky" National Nature Reserve and "Mongol Daguur" National Nature Reserve. This "international" approach is significant in preserving endangered plants and animals and the world's unique multi-natural system. (See attached map of CMR-DAURIA International Nature Reserve)

Address: Management Bureau of Dalai Lake National Level Nature Reserve, Dalainuor Mineral Zone, Man Zhouli City, Inner Mongolia, P.R.China
Post Code: 021410
Tel: +86 470 6523 887
Fax: +86 470 6524 788
[http:// www.dalailakenr.org](http://www.dalailakenr.org)
Email: office@dalailake.com

处于三国边境交界处的达赉湖生物圈保护区，北邻俄罗斯联邦，南接蒙古国。位于北纬47° 45' 50" - 49° 20' 20"，东经116° 50' 10" - 118° 10' 10"之间。保护区总面积7400平方公里，其中44%的湿地是候鸟栖息的“伊甸园”，55%的草原是当今世界上保持最完好的天然草原。达赉湖保护区建立于1986年，1992年晋升为国家级自然保护区，2002年被列入国际重要湿地名录，并被联合国教科文组织接纳成为“世界人与生物圈”保护区网络成员。作为保护珍稀鸟类及其赖以生存的湖泊、河流、湿地及草原生态系统的综合性保护区，达赉湖生物圈保护区是大洋洲-东北亚候鸟迁徙“旅途”中的“驿站”。基于相似的自然环境和保护物种，达赉湖生物圈保护区与俄罗斯“达乌里斯基”国家自然保护区、蒙古国“蒙古达乌尔”国家自然保护区达成的CMR(中、蒙、俄)国际合作，对保护世界上仅存的多种自然结构和濒危动植物种意义深远。

联系方式：

中华人民共和国内蒙古自治区满洲里市扎赉诺尔矿区内蒙古达赉湖国家级自然保护区管理局

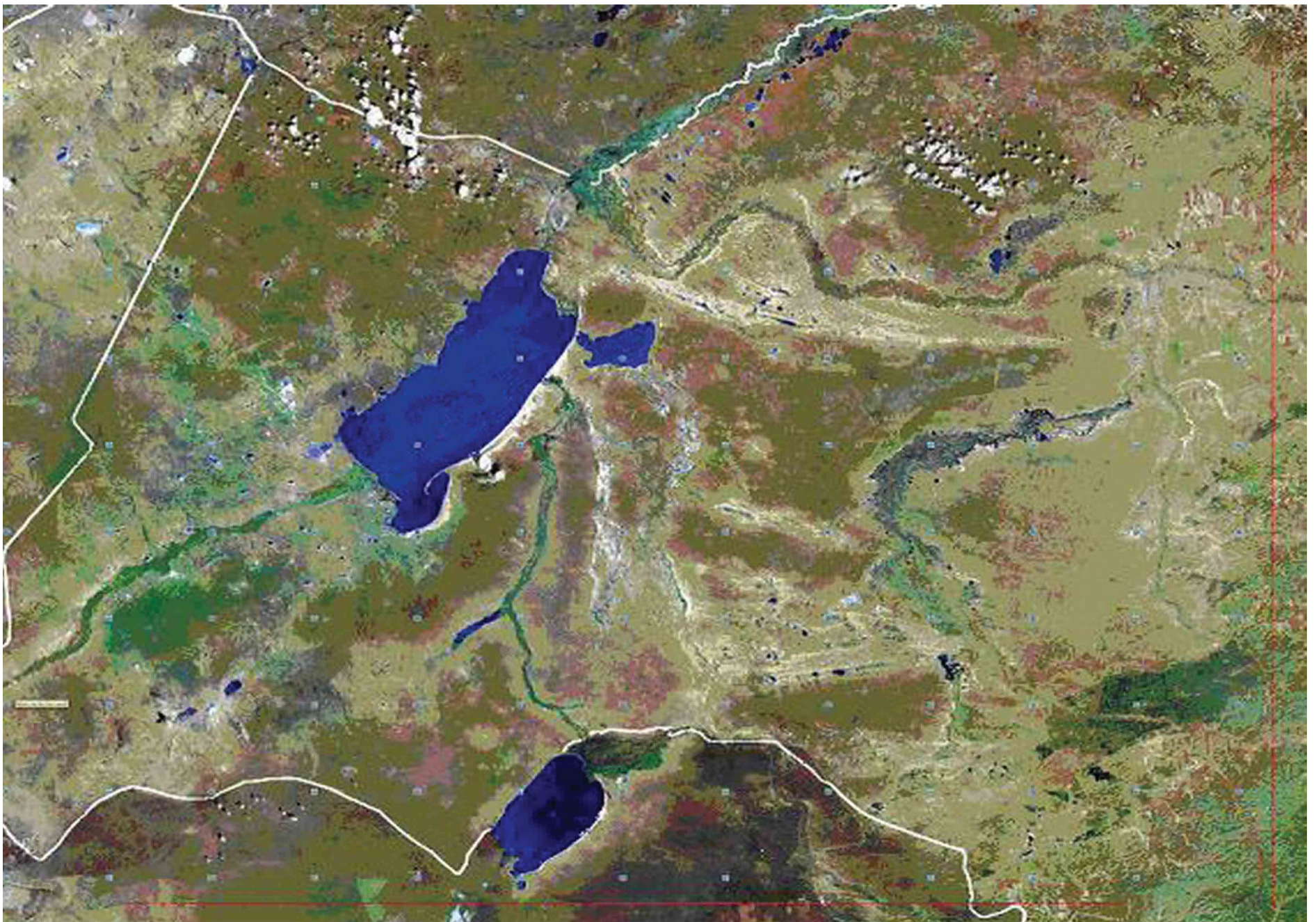
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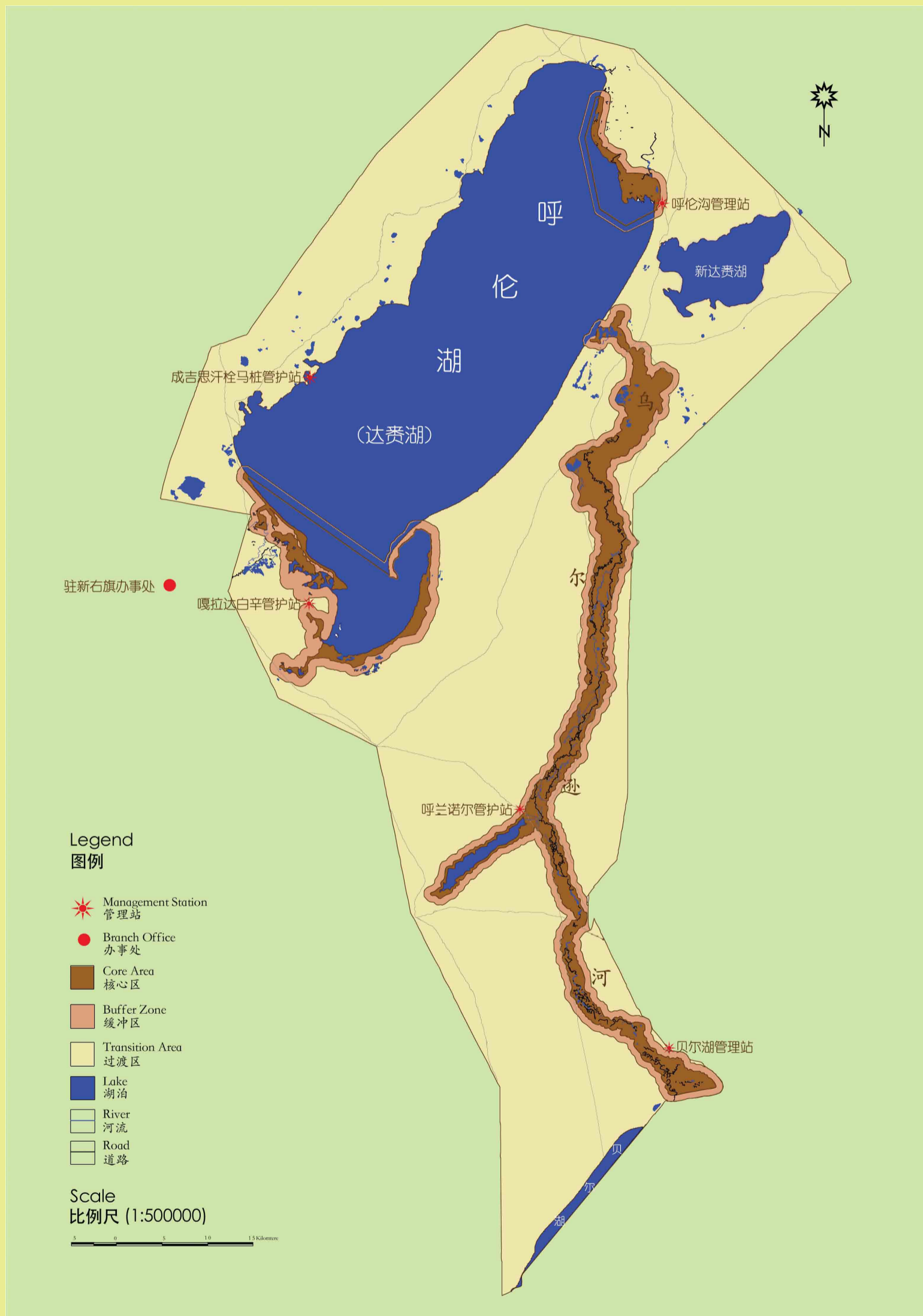
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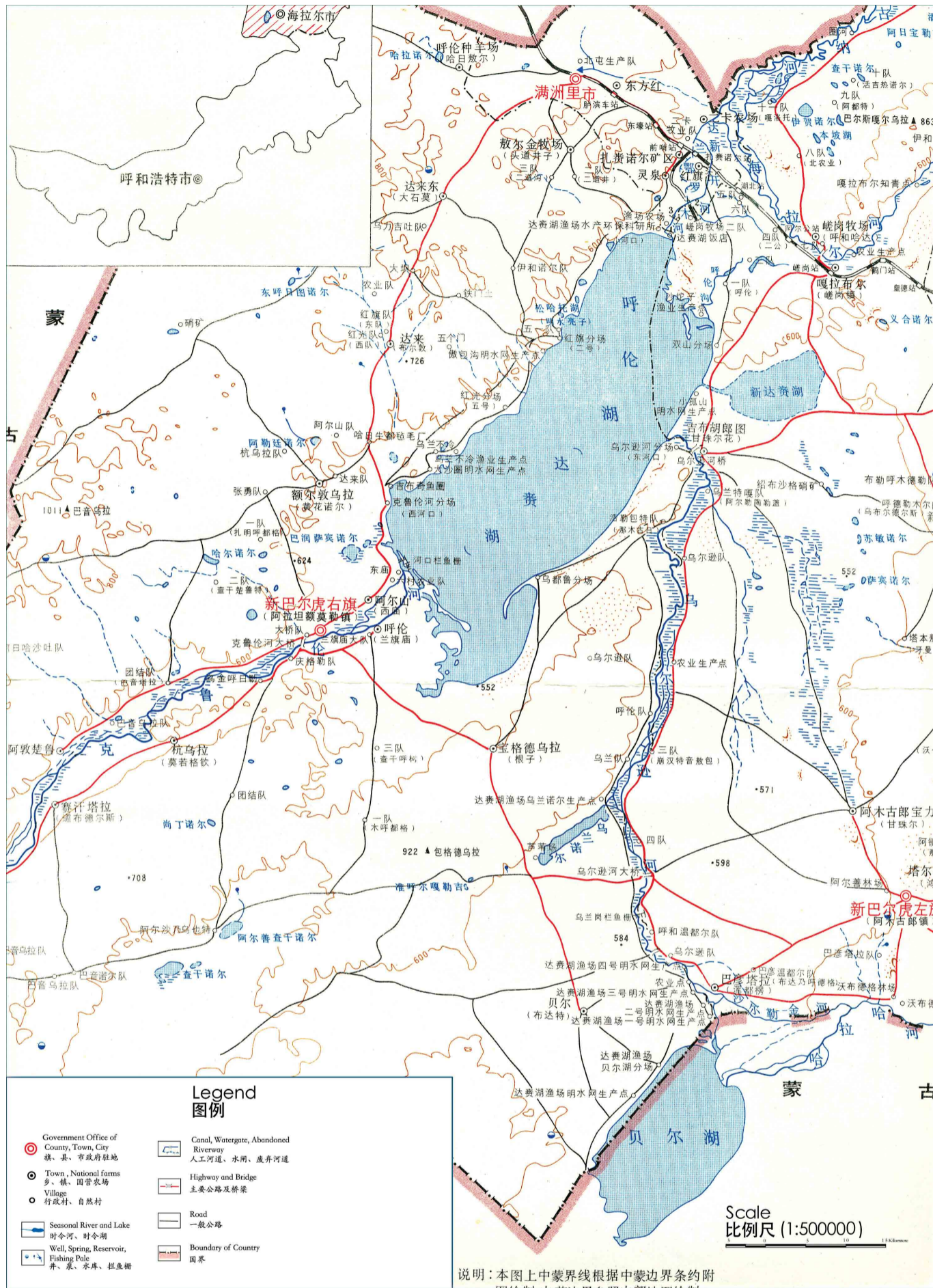
The Zonation Map of Dalai Lake Biosphere Reserve

达赉湖生物圈保护区功能区划图



The core zone of Dalai Lake Reserve is 759.5km², buffer zone 386.5km², and transition zone 6,254km². As the "sacred land" for endangered migratory birds, the core zone is strictly off limits to all individuals and organizations. Scientific research and monitoring can be undertaken in the buffer zone, while in the transition zone, controlled herding and fishing is allowed in the vast natural grassland and the waters of Hulun and Beier Lakes. Industry and tourism are allowed in the Xiaohekou at the northern end of Dalai Lake and the Genghis Khan Shuanmazhuang at the west bank. Six management and conservation stations have been set up at, Wulannuoer, Gadabaixin, Beier Lake in core zone, Hulun Gou, Xiaohekou and the Genghis Khan Shuanmazhuang, and will act as "outposts" for bird conservation and scientific research and monitoring. The reserve is under co-management with the local communities, and a harmonious co-existence between man and nature is expected to be achieved.

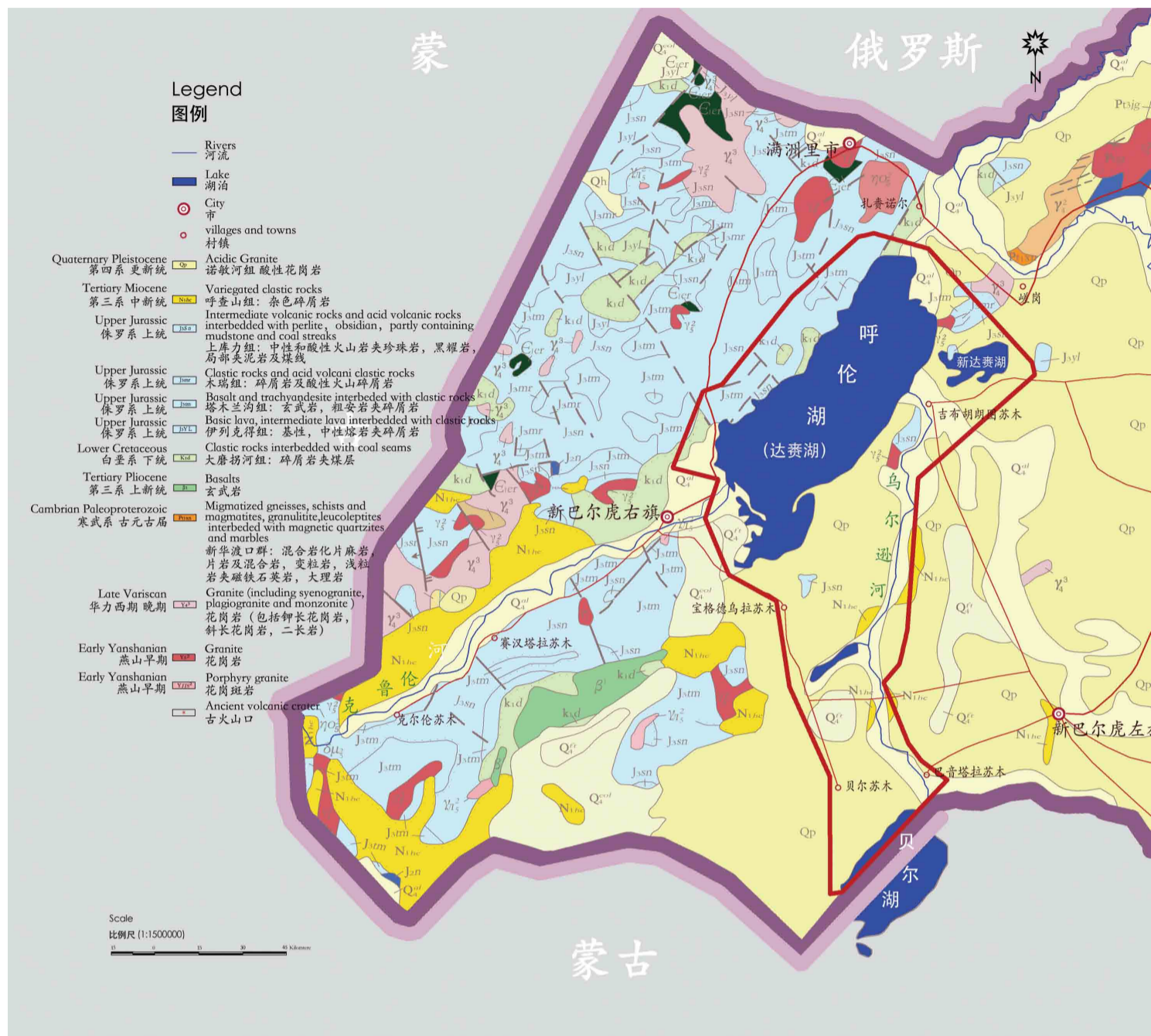
达赉湖生物圈保护区核心区面积759.52平方公里；缓冲区386.50平方公里；过渡区6253.98平方公里。作为珍稀候鸟赖以栖身的"秘境"，核心区受到严格保护。缓冲区内只允许开展科学研究观测活动。过渡区内广袤的天然草场和呼伦湖、贝尔湖的宽阔水域内只允许有限的牧、渔业生产；个别区域则允许进行正常的生产经营和旅游观光，如达赉湖北端小河口和西岸成吉思汗拴马桩这两小处旅游景点。保护区内共设立了乌兰诺尔核心区、嘎达白辛核心区、贝尔湖核心区、呼伦沟、小河口及成吉思汗拴马桩6个管护站。它们是守护珍稀鸟类的"哨兵"，是科研观测的"前沿"，是保护区与当地百姓开展社区共管，恢复人与自然和谐相处的"纽带"。



Dalai Lake Reserve is located at the foot of the Daxinganling Mountains and the Hulunbeier Plateau of the eastern Inner Mongolian Plateau. Halaha River originates from the Daxinganling Mountains and creates Beier Lake. The northern section of Halaha River is also called Wuexun which connect the Beier Lake and Hulun Lake. Hulun Lake is so called Dalai Lake, the biggest lake in Inner Mongolia, the 5th largest in China. Hulunberer Grassland is actually named after the lakes. The three lakes of Hulun, Beier and Wulannuoer, together with the three rivers of Kelulun, Wuexun, and Dalanerluomu, are essential for the survival of the wildlife in the area. The landforms in the surrounding areas are mainly lake basins, lakefront, floodplains, sand land, low mountains and hills, and high plateaus. Created by the Lelulun, Wuexun and Halaha Rivers, the floodplains and lakefront lie between the altitudes of 545 to 800 meters. Wetlands were also created by the rivers on the floodplains, and vegetation flourishes in these areas.

达赉湖生物圈保护区位于大兴安岭西麓内蒙古高原东部的呼伦贝尔高原。发源于大兴安岭的哈拉哈河造就了“贝尔湖”，她由此北上时，更名为“乌尔逊”河，继续注入“呼伦湖”。呼伦贝尔大草原就得名于这形同姐妹的湖泊。呼伦湖、贝尔湖、乌兰诺尔和克鲁伦河、乌尔逊河、达兰鄂罗木河形成的紧密相连的“三湖三河”水系网络，决定着流域内物质的生息与共。

与河湖网络相伴的是该地区以湖盆、滨湖平原和冲积平原、河漫滩、沙地、低山丘陵及高原为主的地形地貌。克鲁伦河、乌尔逊河、海拉尔河在古代不断冲积，后来又经过湖水淹没改造形成了大面积海拔在545—800米之间的冲积平原与滨湖平原。河流沿岸一带地势低洼平坦的河漫滩，孕育形成了河流型湿地，上覆茂盛的植被。



地质年代表 (部分)
Geochronologic Chart (part)

代	纪	世	距今约 (百万年) Million Years Ago	主要生物演化 Evolution of Major Life-Forms	构造阶段 Orogeny Phase	
新生代 Cenozoic	第四纪 Quaternary	全新世 Holocene	0.01	现代 Present	喜马拉雅期 Himalayan Phase	
		更新世 Pleistocene	2.4	人类时代 Age of Man		
	第三纪 Tertiary	上新世 Pliocene	5.3	现代植物 Modern Plants		
		中新世 Miocene	2.3	哺乳动物 Mammals		
		渐新世 Oligocene	36.5	被子植物 Angiosperms		
		古新世 Paleocene	6.5			
中生代 Mesozoic	白垩纪 Cretaceous	中 晚	1.35	爬行动物 Reptiles	燕山期 Yanshanian Phase	
		早	20.5			
	侏罗纪 Jurassic	中 晚	2.50	种子植物 Gymnosperms	印支期 Indosinian Phase	
		早	290			
	古生代 Palaeozoic	三叠纪 Triassic	中 晚	3.55	两栖动物 Amphibians	(海西) 华力西期 Variscan Phase
			早	4.10		
二叠纪 Permian		中 晚	4.38	鱼类 Fishes		
		早	5.10			
石炭纪 Carboniferous	中 晚	5.70	蕨类植物 Pteridophytes	加里东期 Caledonian Phase		
	早					
奥陶纪 Ordovician	中 晚		藻类 Algae			
	早					
寒武纪 Cambrian	中 晚		无脊椎动物 Invertebrates			
	早					

1. The divisions of stratum layers correspond to the geologic time system: Eon, Era, Period, Epoch

宇、界、系、统的地层纪录分别对应地质年代的宙、代、纪、世。

2. The stratum layers of lower, middle and upper correspond to geologic time early, middle and late in the chart.

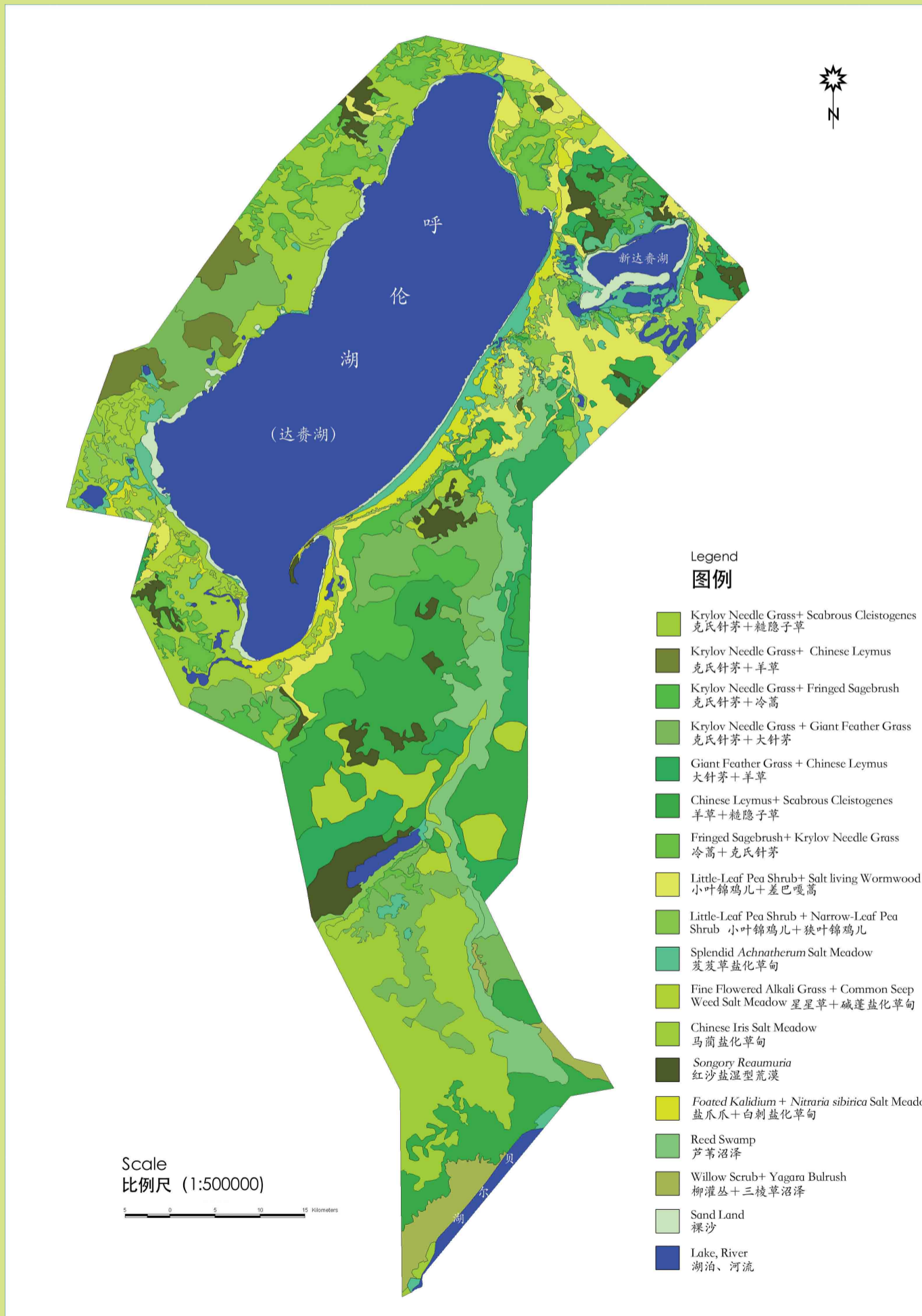
下、中、上的地层单位对应早、中、晚的地质时间

Diastrophism ten million years ago, climate change and new geotectonic movement made the vast grassland, wavy hills, winding rivers, deep lakes and rich wetlands possible. Folds formed in the earlier time created the low hills in the northwest next to the Dalaiouer and Kelulun Rivers. The mountains are made of a number of different rocks including Mesozoic lava, Hercynian and Yanshanian granite, and sporadic Cambrian stratum. East of Hulun Lake, hills and mountains next to Cuogang town and Genzi, these mountains are formed mainly of Mesozoic lava and Yanshanian granite. In the area between these two mountainous regions are the Cuogang Pasture, Hulun Lake basin, and the depression of Kelulun River. In these areas, we can see Mesozoic volcano chippings and cretaceous coal layer, both exposed on the surface of the earth.

Fracture is another main geological structure of the area. It not only explains the distribution of the rivers and lakes, but also created sufficient space to contain underground water. Fracture in the Hulun Lake and the Kelulun River valley channels underground water onto the ground surface.

是什么造就了达赉湖生物圈保护区内草原广袤、丘陵起伏、河流蜿蜒、湖泊深邃、湿地丰沛? 一亿年前的地壳变动, 亿万年的沧桑变化, 地壳挤压形成的褶皱, 令丘陵隆起, 盆地凹陷, 积水演化成为湖泊, 经过了新构造运动并结合气候的周期性变化, 湖周演替为广阔的草原, 形成了充满生机的湿地及草原生态系统。早期以褶皱为主的地质构造生成了扎赉诺尔-克鲁伦河一线西北的低山丘陵, 主要成分为中生代火山岩、海西期和燕山期花岗岩和零星寒武系地层; 呼伦湖以东大面积的平坦区内, 则是以第四系下伏中生代火山岩和燕山期花岗岩为主的嵯岗镇-根子一线的山地和丘陵。这两条北东走向的低山丘陵之间, 嵯岗牧场-呼伦湖盆-克鲁伦河下降区内有中生代的火山碎屑岩和白垩系含煤地层出露。

断裂是本区的又一主要地质构造。遍布全区的断裂构造不仅呈现了湖、河的形成与分布, 同时, 纵横交错的断裂构造切穿湖底, 为地下水提供了充足的贮藏空间, 使构造裂隙水成为本区主要地下水类型之一。呼伦湖和克鲁伦河谷都是地下水富集的地壳局部下降区, 此处的断裂构造为地下水涌出地表提供了通道。



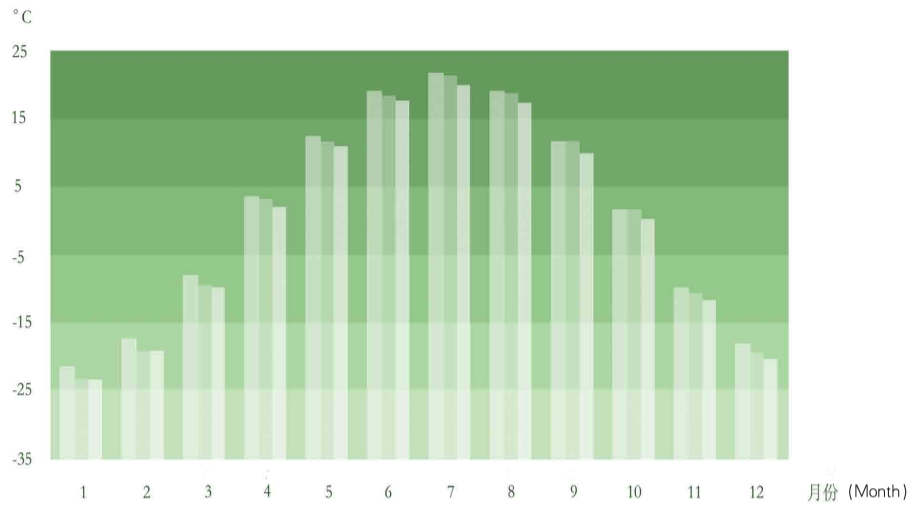
There are 653 species in the 74 families of seed plants in the Dalai Lake Reserve. Vegetation types include Typical steppes, Psammophytic vegetation, Salt meadow, Swamp vegetation and Meadow vegetation.

Krylov Needle grass and Giant feather grass/ are the major vegetation communities of the low mountains and hills, high plateau and floodplains. In smaller areas, Chinese leymus, Bunch grass are also distributed. Psammophyte is present (although scarce) in the south and east of Dalai Lake, Salt vegetation is widely distributed along the lake shore and lowlands. Swamp vegetation can be found in lake plains, floodplains, seasonal or long-term seep and they are the most important vegetation types of the reserve. Meadow vegetation is seen on the non-salty floodplains, vegetation includes Mesochore grass, Chinese leymus, Garden burnet, Silverweed cinquefoil. The rich vegetation family provides abundant high-quality pasture for the Hulunbeier Grassland, and holds water in the sandy areas. The taller plants also connect the lakes and wetlands, and provide a perfect habitat for birds. The variety of plants not only shows the biodiversity value of the region but is also essential for substance circulation and energy transform in the ecosystem.

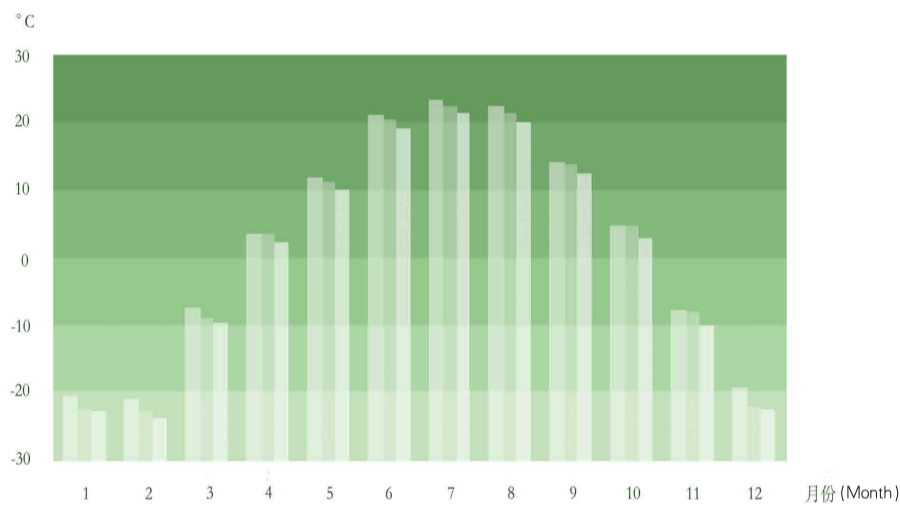
达赉湖生物圈保护区的植物共计有野生种子植物 74 科 653 种，主要植被类型有：典型草原植被、沙生植被、盐生草甸、沼泽植被、草甸植被。

典型草原是达赉湖生物圈保护区内的地带性植被，遍布低山丘陵、高平原和冲积平原上，主要分为分布面积最广的克氏针茅草原群系和分布面积较小的大针茅、羊草、丛生小禾草原两个群系；沙生植被主要分布于达赉湖东、南沙地上，群落稀疏；盐生植被在湖泡及古河道等低洼地区生机盎然；沼泽植被生长于河漫滩、季节性积水或长年积水地段，是保护区最重要的植被类型；草甸植被在河流漫滩非盐化地段上构建它的群落，主要成员包括中生禾草、羊草、地榆、鹅绒委陵菜等。

典型草原植被为呼伦贝尔草原提供充足的优质牧草，沙生植被既是沙地水土保持的“士兵”，也是牲畜冬季的“美食”。盐生草甸、沼泽植被、草甸植被因为生长茂盛、隐蔽性强和水道相通，为各种鸟类觅食、繁殖、栖息、准备迁徙提供得天独厚的条件。多种植物类型所组成的植被网络不仅丰富了保护区内的生物多样性，它们的真实作用是生态系统中物质循环和能量流动的“基础工程”。



Average monthly temperature of Dalai Lake Area (2005)
达赉湖地区 (2005) 月平均气温

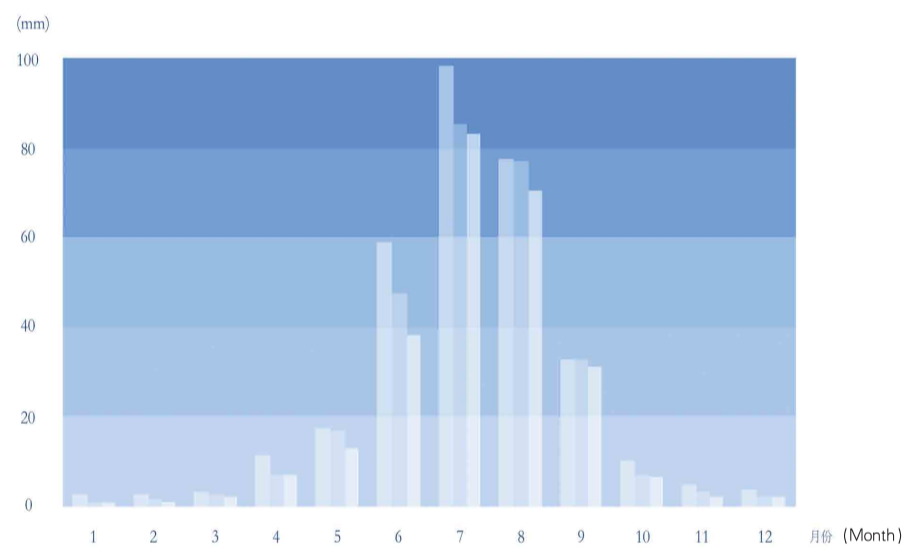


Average monthly temperature of Dalai Lake Area (1971-2004)
达赉湖地区 (1971-2004) 月平均气温

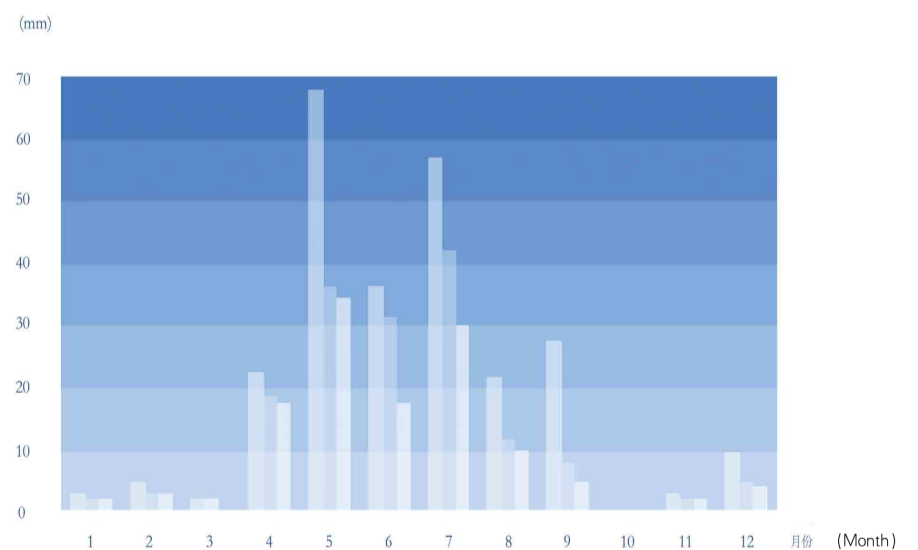
Dalai Lake Reserve has a temperate and semi-arid climate, the temperature fluctuates drastically between hot and cold. It is windy and dry in spring; summer is warm and short; autumn comes suddenly and the temperature drops quickly; and winter is always long and bitterly cold.

The air in the reserve is clear, and the sun is intense with 3,104.7 average annual sunshine hours. The annual precipitation is 247 to 319 millimeters and occurs mostly in summer. Rainfall from June to September accounts for 80% to 86% of the year's total, with the vast majority of rain occurring in July and August, a total of 145 to 170 millimeters. Annual evaporation is about 1,636 millimeters, and is 5 to 6 times higher than the amount of precipitation. The annual relative humidity is 68%.

Season, precipitation, sunshine and the other elements have created suitable conditions for wetlands and grasslands, the wetland and grassland systems are super sensitive to the climate. For example, rainfall is the most important aspect of climate for Dalai Lake Reserve. It determines the growth and trends of the vegetation. On the opposite, the wetland and grassland ecosystems are also influence rainfall and temperature by holding water and adjusting humidity.



Average monthly rainfall of Dalai Lake Area (2005)
达赉湖地区 (2005) 月平均降水量



Average monthly rainfall of Dalai Lake Area (1971-2004)
达赉湖地区 (1971-2004) 月平均降水量

达赉湖生物圈保护区属中温型半干旱大陆性气候，具有寒暑剧变的特点。春季干旱多风，夏季温凉短促，秋季降温急、霜冻早，冬季严寒漫长。

保护区大气透明度高，太阳辐射强度大，全年平均日照时数为 3104.7 小时。年平均降水量为 247 - 319 毫米，降水多集中在夏季，6-9 月份降水占全年的 80-86%，峰值在 7、8 月间，降水量在 145-170 毫米。年平均蒸发量为 1636 毫米，是降水量的 5-6 倍。年平均相对湿度 68%。

气候中季节、降水、日照等诸因素相互影响作用，形成了适宜湿地、草原生态系统生息的综合条件，但同时湿地、生态系统对气候的反应也是异常的敏感。例如，作为影响达赉湖保护区气候的最主要因素，降水决定着湿地、草原生态系统植被的生长、变化趋势。同时，湿地、草原生态系统也对气候环境产生反作用，它通过涵养水源、调节湿度来影响降水和气温。



The controlled land of Dalai Lake Reserve is mainly used for animal husbandry, fishing and core zone management. Also, in north of the reserve, there is a small piece of land for tourism and household gardening.

Animal husbandry is the major industry in the reserve. Although grassland is now contracted to individual households and the herding tradition has been changed in most areas, there are still places that maintain traditional tribal ways, living only off the water and grass. The waters around Hulun Lake (Dalai Lake) and Beier Lake are the biggest fishing bases of Inner Mongolia, and the 6 sites around the lakes produce 10,000 tones of fish each year (pre 1997). The Genghis Khan Shuanmazhuang area at the west bank and the north estuary of the Dalai Lake has a 30 year history of tourism, and receives 100,000 tourists annually, generating income of one million Yuan (RMB). In 1998, the reserve authority established a management and conservation station in Genghis Khan Shuanmazhuang tourism zone to manage tourism activities; hence the reserve is prepared for future ecotourism projects. Areas of sandy vegetation in the south and east banks of the Dalai Lake remain undeveloped due to its fragile nature.

The eclogue brings us the imagination of the peaceful living picture of the grassland. But the fact also tells us the pressure from excessive herding and fishing, once the balance of land utilization is broken, would it only be the recollection of vast grassland, blue sky, dancing animal while the sand wind is blowing?

达赉湖生物圈保护区内的土地利用方式，主要包括牧业用地、渔业用地和保护区的核心管理用地，在保护区北部地区有小范围的旅游用地、家庭庭院内的绿化用地。

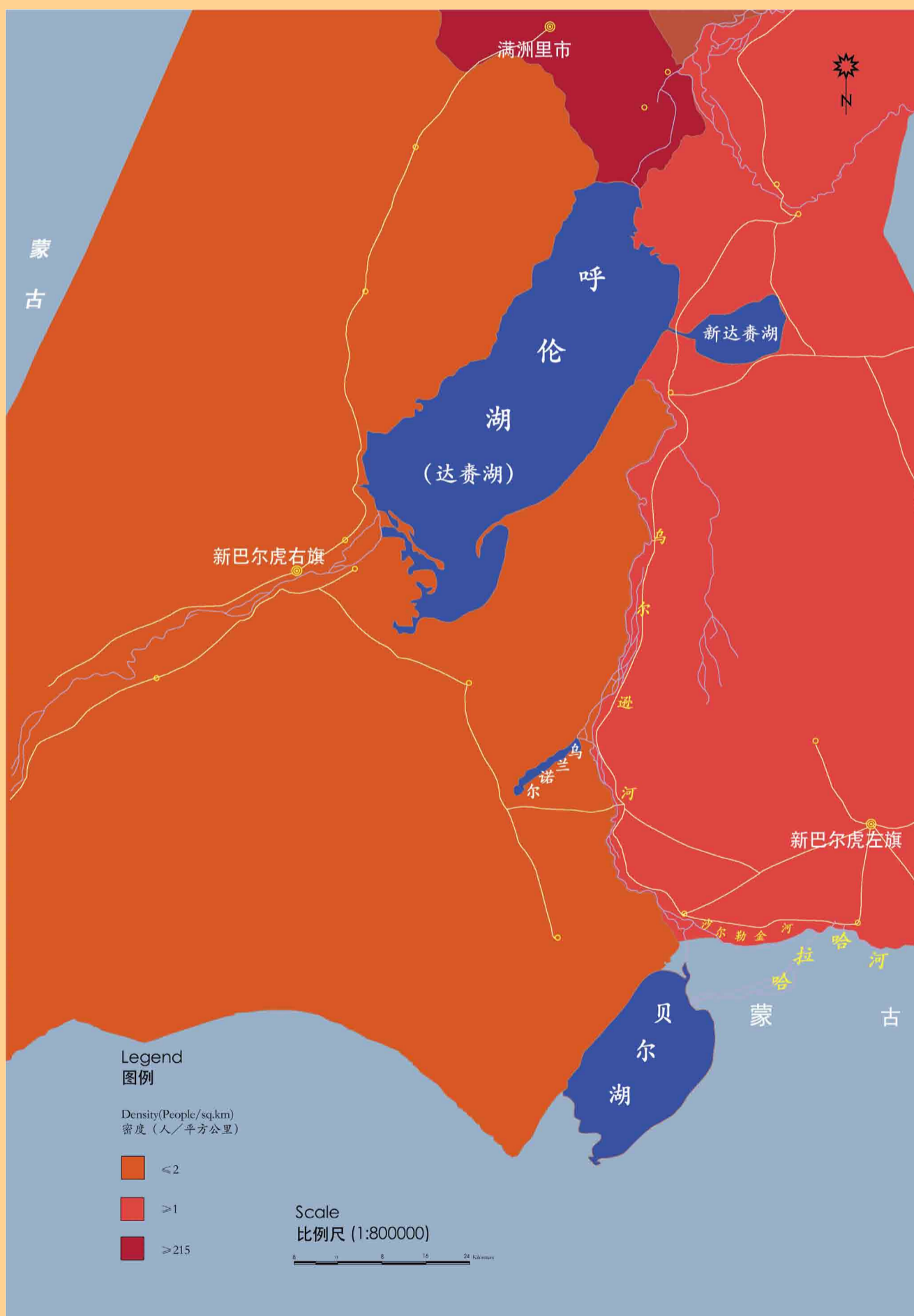
广袤丰饶的天然草场是本地区重要畜牧业生产基地，虽然现在草场已承包到户，传统的游牧方式受到冲击，但在一些地方仍保留着逐水草而居的传统；呼伦湖（达赉湖）和贝尔湖仍是内蒙古自治区最大的渔业生产基地，沿湖的6个渔业生产点，年生产渔业产品1.万吨左右（1997年以前）；达赉湖北端小河口和西岸成吉思汗控马桩旅游区，已有30多年旅游发展史，每年接待近10万游客，旅游收入近百万元。1998年保护区建立了成吉思汗控马桩旅游区管护站，除了美化景点环境，还对旅游活动进行管理，达赉湖南岸、东岸的沙地植被稀疏，基本没有开发利用。

人们在这块土地上劳作、生活的内容都被编织到动听的牧歌中，我们在歌声中想象着草原的祥和。但是，当现实中对土地的利用打破了平衡，无论是过度放牧、过度捕捞，还是过多地人类活动，草原“母亲”终究会不堪重负，到那时，草绿天高、鱼跃鸟翔、牛羊漫步会不会成为风沙掠过时的回忆？



The Population Density Map of Dalai Lake Biosphere Reserve

达赉湖生物圈保护区人口密度图



Mongolian had the tradition to name the tribes after the places where they originally herded. Baerhu is one of the oldest tribes of Mongolian and got its name from the Baerhuzhen River in north-west Baikal where they herd and fish. The government of Qing Dynasty made Baerhu tribes move to Hulunbeier Pasture twice in order to defend the country

border, and their descendents are now living in Chenbaerhu Qi and Xinbaerhuzuo Qi and Xinbaerhuyou Qi.

The reserve includes 11 Sumon ①, 2 townships, 2 state-owned pastures, 1 coal mine, 2 Gacha (Gacha means village) under Xinbaerhuyou Qi, Xinbaerhuzuo Qi, and Manzhouli city. The total number of households is 2,618 with a population of 11,250. 50% of the households are scattered along the marginal areas of the Reserve, and the population density inside the Reserve is 0.8 per square kilometer. Mongolian is the major population here and their pastures are mostly inside the reserve. Their normal herding practices don't affect the wildlife in the reserve, but more monitoring of pasture usage should be undertaken.

Population density is one of the sensitive indicators when assessing and predicting the health of grassland eco-systems. Under the current production levels, dense population will become a heavy burden and negatively impact the development and living conditions of the locals. Therefore maintaining the reasonable rate of population increase and appropriate living style are very important to a sustainable environment.

蒙古人有以部落游牧所在地命名的习俗，“巴尔虎”蒙古部是蒙古族中最古老的一支，因最早在贝加尔湖北部的巴尔虎真河游牧而得名。明清政府为戍边先后两次迁驻“巴尔虎”蒙古旗到呼伦贝尔牧区，他们的后代就居住在今天的陈巴尔虎旗和新巴尔虎左、右两旗。

达赉湖生物圈保护区内包括新巴尔虎右旗、新巴尔虎左旗、满洲里市所辖的共计11个苏木①、2个镇、2个国营牧场和1个矿区、2个嘎查和生产队，总户数 2618 户，人口 11250 人，50% 以上人口分布在保护区边缘地带，保护区内人口密度为 0.8 / km²，居民以蒙古族为主，这些居民的草场大多处于保护区境内，正常牧业对保护区境内的动物不会造成压力，但需要对草原的其他利用方面进行监控，如渔业、旅游业等。

在现有生产力水平条件下，高密度的人口必然会对草原生态系统造成沉重的负担，对当地社会经济发展和牧民生活水平产生负面影响。反之，只有保持合理的人口密度和与当地生态环境相适应的生活方式才让我们看到人与草原和谐互惠的曙光。

① Sumon is the basic territorial unit of ancient Mongolian based on military purpose

苏木是古时蒙古族基于军事目的最小的领地划分单位。五个苏木为一个旗。

The Pictures of Most Important Flora & Fauna of Dalai Lake Biosphere Reserve

达赉湖生物圈保护区典型动植物区系

1	2	3
4	5	6



(1) Purple Heron (*Ardea Purpurea*) : Widely distributed in Western Europe, Southern central-east Europe, North Africa, Southeastern Russia, Mongolia, Eastern Inner Mongolia and, from northeast and central eastern China to Southern China. Its habitat is in bogs and wetlands; they look for food in the shallow waters, and nest in bulrush. Purple Heron is common in the reserve but not in large numbers.

(2) White-Naped Crane (*Crus Vipio*) Distributing in eastern Siberia, eastern Mongolia and northeastern China in the warmer months, they migrate to southern China, the DPRK (Democratic People's Republic of Korea) and Japan for the winter. Its habitat is the bulrush in the bogs, and they sometimes look for food in the crop fields. They re-produce in the reserve but are not seen in large numbers.

(3) Eurasian Spoonbill (*Platalea Leucorodia*): distributed in western, eastern and southern Europe; coastal wetlands of North Africa (Mediterranean, Black Sea, Caspian Sea); Mongolia; Russia; western Xinjiang, eastern Inner Mongolia and northeastern China. The spoonbill migrates through northern and eastern China to the south for winter. They can be seen in Yunnan in China and Burma, looking for food in shallow water and muddy banks, and nesting in bulrush. Large numbers are commonly seen in the Reserve.

(4) Mongolia Gazelle (*Procapra gutturosa*) : Typical species of the Mongolian Plateau, used to be widely seen in Daguur Grassland, currently distributed across eastern Mongolia, the outer Baikal area of Russia, western Hulunbeier City in eastern Inner Mongolia in China. They used to be seen in large numbers in and around the reserve. As an "indicator" species of the grassland ecosystem, numbers have drastically reduced in China hence they need strict protection.

(5) Typical Steppes: is the regional vegetation of the Dalai Lake Reserve, and can be categorized into two groups: one is the sparsely-distributed, Giant feather grass, Chinese leymus, Bunch grass; the other is the most important vegetation type of the reserve, the Krylov Needle grass steppe community, which is can be seen from the Cuogang Pasture to the northern part of Dalai Lake in northeast of the reserve, and extends to Baikal in the west and south.

(6) Bog Meadow: distributes at the floodplain and non-salty area, includes Mesochore grass, Chinese leymus, Garden burnet and Silverweed cinquefoil.

(1) 草鹭 (*Ardea Purpurea*) : 广泛分布于西欧、中、东欧南部, 北非; 俄罗斯东南部、蒙古国, 中国内蒙古东部、东北、中东部至华南。栖息与沼泽湿地, 浅水区觅食, 芦苇中作巢。草鹭在达赉湖保护区是常见数量不大的种类。

(2) 白枕鹤 (*Crus Vipio*): 分布于西伯利亚东部, 蒙古国东部, 中国东北; 华南、朝鲜、日本越冬。栖息于芦苇沼泽, 有时农田觅食。达赉湖保护区数量不大的繁殖鸟。

(3) 白琵鹭 (*Platalea Leucorodia*): 分布: 西欧、东、南欧, 北非沿海湿地 (地中海、黑海、里海沿岸); 中国新疆西向东经蒙古国和俄罗斯联邦至内蒙古东部、东北地区; 经华北、华东至华南越冬; 中国云南和缅甸也有分布。泥岸浅水处觅食, 芦苇中营巢。达赉湖保护区常见、大量繁殖鸟。

(4) 黄羊 (*Procapra gutturosa*) 蒙古高原的典型物种, 曾广泛分布在达乌尔草原地区。目前分布在蒙古国东部、俄罗斯外贝加尔地区。中国分布在内蒙古东部呼伦贝尔市西部。达赉湖保护区及周边地区曾大群分布, 作为草原生态优劣的“指示物种”, 目前在我国境内数量急剧下降, 亟待严格保护。

(5) 典型草原 (Typical Steppes) : 是达赉湖生物圈保护区的地带性植被, 主要可分为两个群系: 一是分布面积较小的大针茅、羊草、丛生小禾草原, 以大型旱生丛生禾草—大针茅为建群种, 根茎禾草—羊草为群落中优势种, 糙隐子草、冰草也起着一定的优势作用; 二是克氏针茅草原群系, 群落以丛生旱生禾草—克氏针茅为建群种, 羊草、糙隐子草和冷蒿是常见的优势种。克氏针茅草原是保护区最主要植被类型, 从保护区东北部崆岗牧场二队向西环达赉湖北、西和南延伸到贝尔湖, 广泛分布着克氏针茅+丛生禾草原。

(6) 沼泽草甸 (Bog Meadow) : 分布于河流漫滩的非盐化地段。以中生禾草为主, 建群种有羊草、地榆、鹅绒委陵菜等。

CMR- "DAURIA" International Protected Area
CMR-达乌尔国际保护区



CMR- "DAURIA" International Protected Area is a joint protected area (the area within the green line) after a signed agreement among the governments of China, Mongolia and Russia in 1994, aiming at protecting the biodiversity in the DAURIA Mongolia grassland. The major task of the CMR-DAURIA International Protected Area is to strengthen the technical exchange and cooperation for the biodiversity within the protected area and to undertake scientific research, public education and training of human resources.

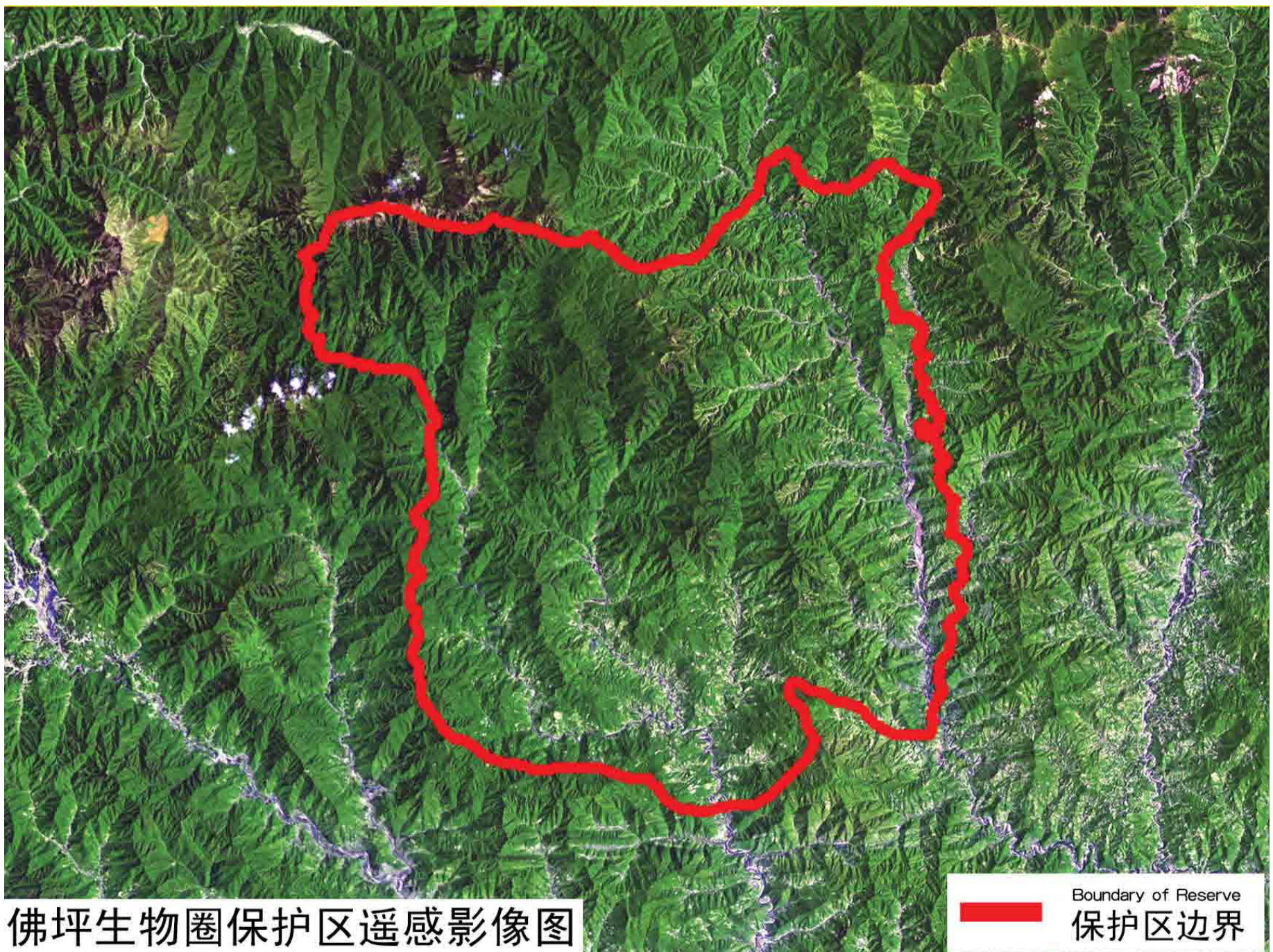
CMR-达乌尔国际保护区 (CMR- "DAURIA" International Protected Area) 是中、蒙、俄三国政府于1994年签署协议成立的共同保护区 (绿线范围内), 旨在保护达乌里-蒙古草原的生物多样性。CMR-达乌尔国际保护区的主要工作是: 加强本地生物多样性保护区的技术交流与合作, 联合进行科研考察、宣传教育、人员培训工作。

The Foping Biosphere Reserve was established in 1978, and is one of the national-level reserves designated to protect the Giant Panda. The reserve is in Foping county, southern Shaanxi province. Situated on the southern slopes of the central Qinling Mountains. Its geographic coordinates are, East Longitude 107° 0′ - 107° 5′ North Latitude 33° 3′ - 33° 6′. The reserve borders Longcaoping Forestry Bureau, Zhouzhi National-level Nature Reserve, Laoxiangcheng Nature Reserve, Taibai Forestry Bureau, Changqing National-level Nature Reserve and the Xueba Township of Foping county and is 158km south of Hanzhong and 215km north of from Xi'an. The reserve is 724.43 km², and has been labeled as a "gene pool of natural plants and animals" for its ancient geological structure, rich soil and well-preserved biodiversity. The Foping Reserve is one of the most typical area of the Qinling Mountains, and is very important for species exchange and protection between neighboring nature reserves.

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佛坪生物圈保护区始建于1978年，是中国专门为大熊猫保护而批准建立的国家级自然保护区之一。它位于陕西秦岭中段南坡腹地，地处陕西南部的佛坪县境内东经107° 0′ - 107° 5′、北纬33° 3′ - 33° 6′。周边与陕西省龙草坪林业局、陕西周至国家级自然保护区、陕西老县城自然保护区、陕西省太白林业局、陕西长青国家级自然保护区和佛坪县岳坝乡为邻。保护区南距汉中市158公里，北离西安市215公里，总面积724.43 km²，区内古老的地质构造和复杂的地貌、湿润的气候和发育良好的土壤，保存相对完好的森林植被和生态环境，丰富的生物多样性和众多的珍稀物种，使其享有“天然动植物基因库”的美称。佛坪生物圈保护区处于秦岭地区最具典型性和代表性的区域及秦岭保护区群的核心，对保护区之间的物种交流和保护工作都十分有利。

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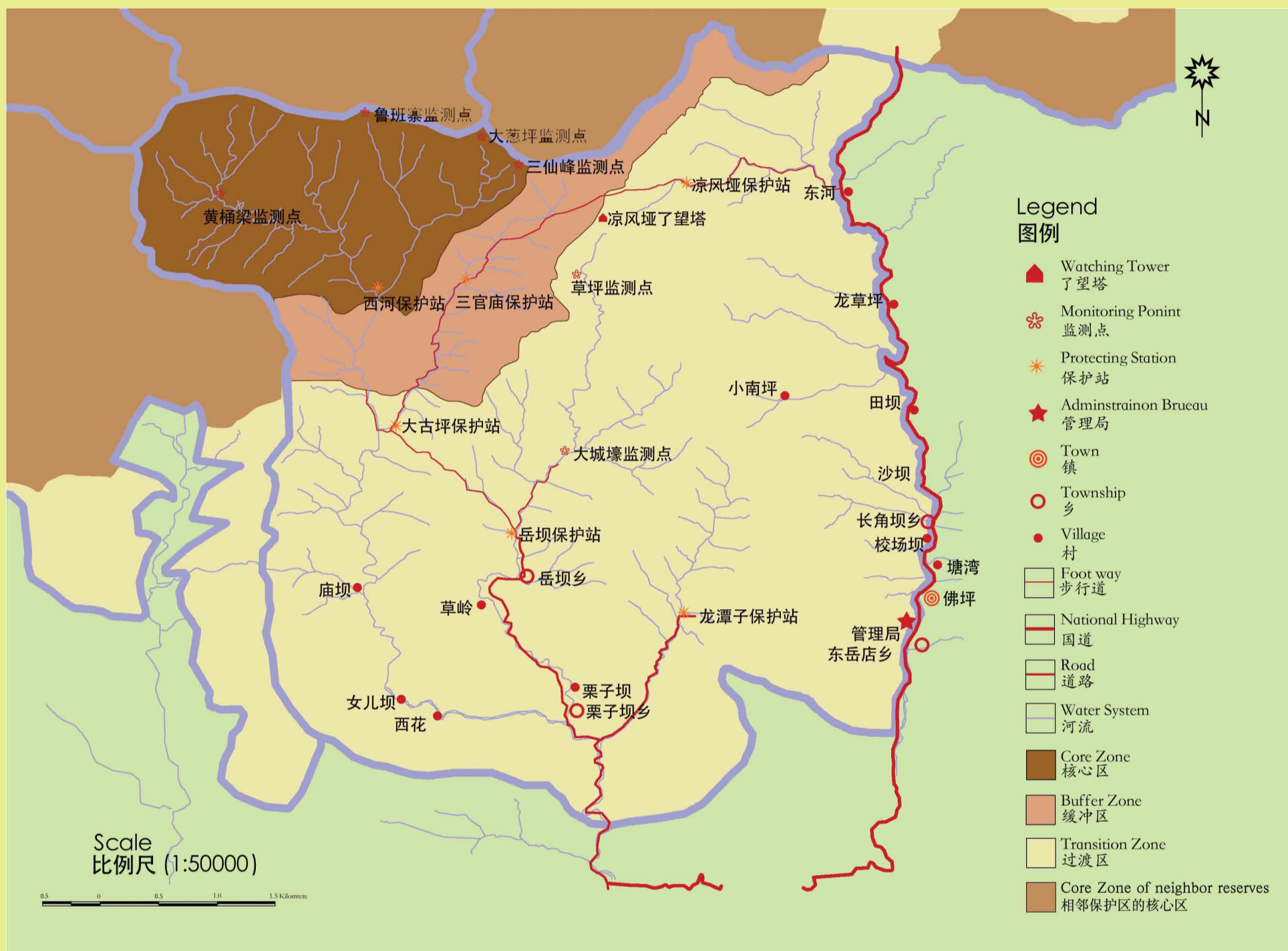
佛坪生物圈保护区遥感影像图

Boundary of Reserve
保护区边界



The Zonation Map of Foping Biosphere Reserve

佛坪生物圈保护区功能区划图

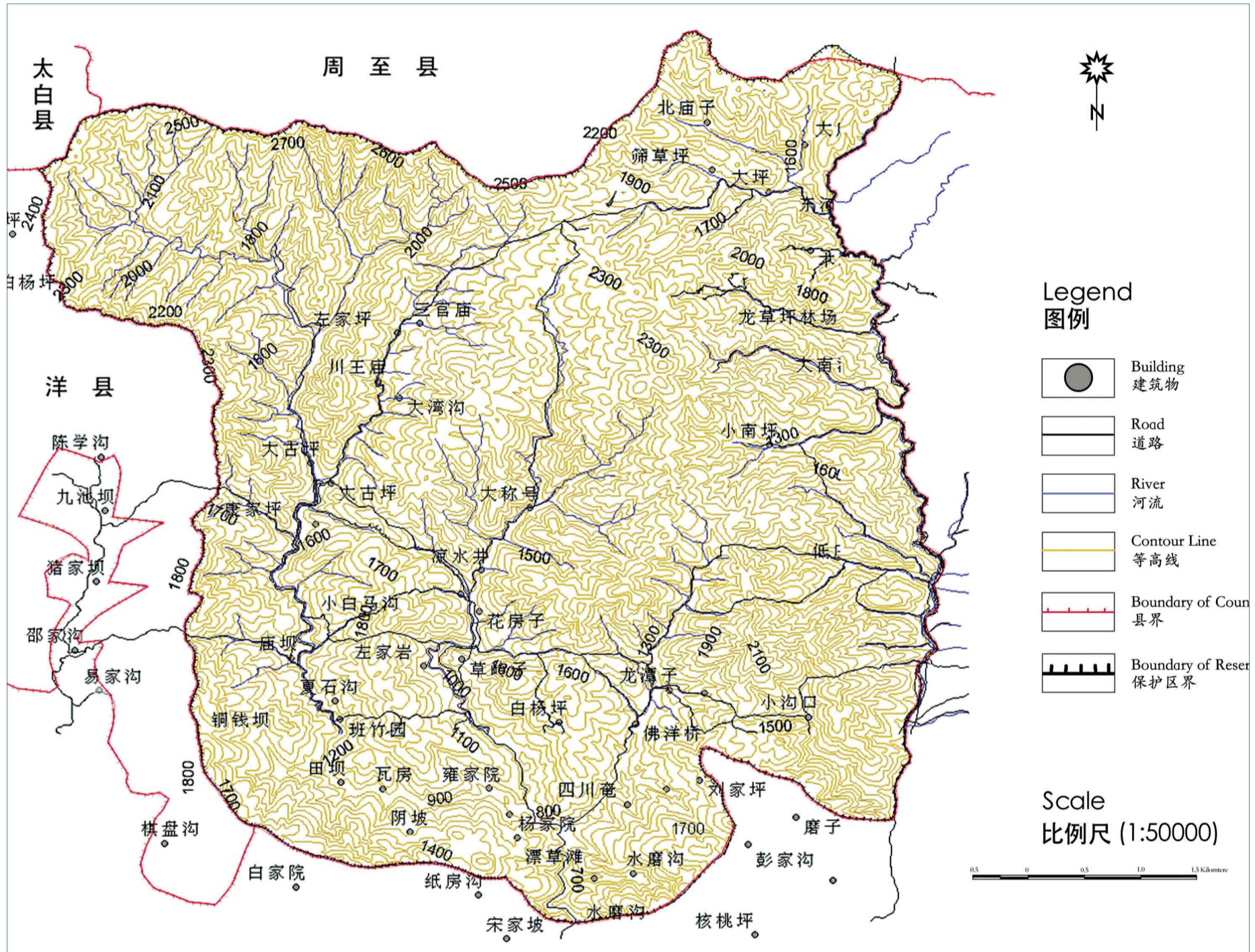


The core zone of the reserve is 103.26 km², buffer zone 61.39 km², and transition area 559.78 km². The core zone is connected with core areas of the surrounding Changqing Nature Reserve, Laoxiancheng Nature Reserve and Zhouzhi Nature Reserve. The fact of linking those core zones greatly strengthens the management of the whole area. After a severe flood in November 2002, people realized that protecting nature reserves is a conservation priority, as a result the government expanded the original 137 km² transition area to its current size of 559.78 km². The transition area accounts for 57% of the total area of Foping county.

The core zone is the most well-preserved and least-disturbed area by human activity. It is where endangered species like Giant Panda live and hence access to the area is strictly prohibited. The buffer zone has a relatively complete eco-system and access is allowed for authorized scientific research and monitoring. The transitional zone is where human activity such as scientific experiments, teaching, eco-tourism and captive breeding most frequently take place. Despite the amount of activity visitors are extremely careful about introducing invasive species so as to maintain the eco-system characters of the species.

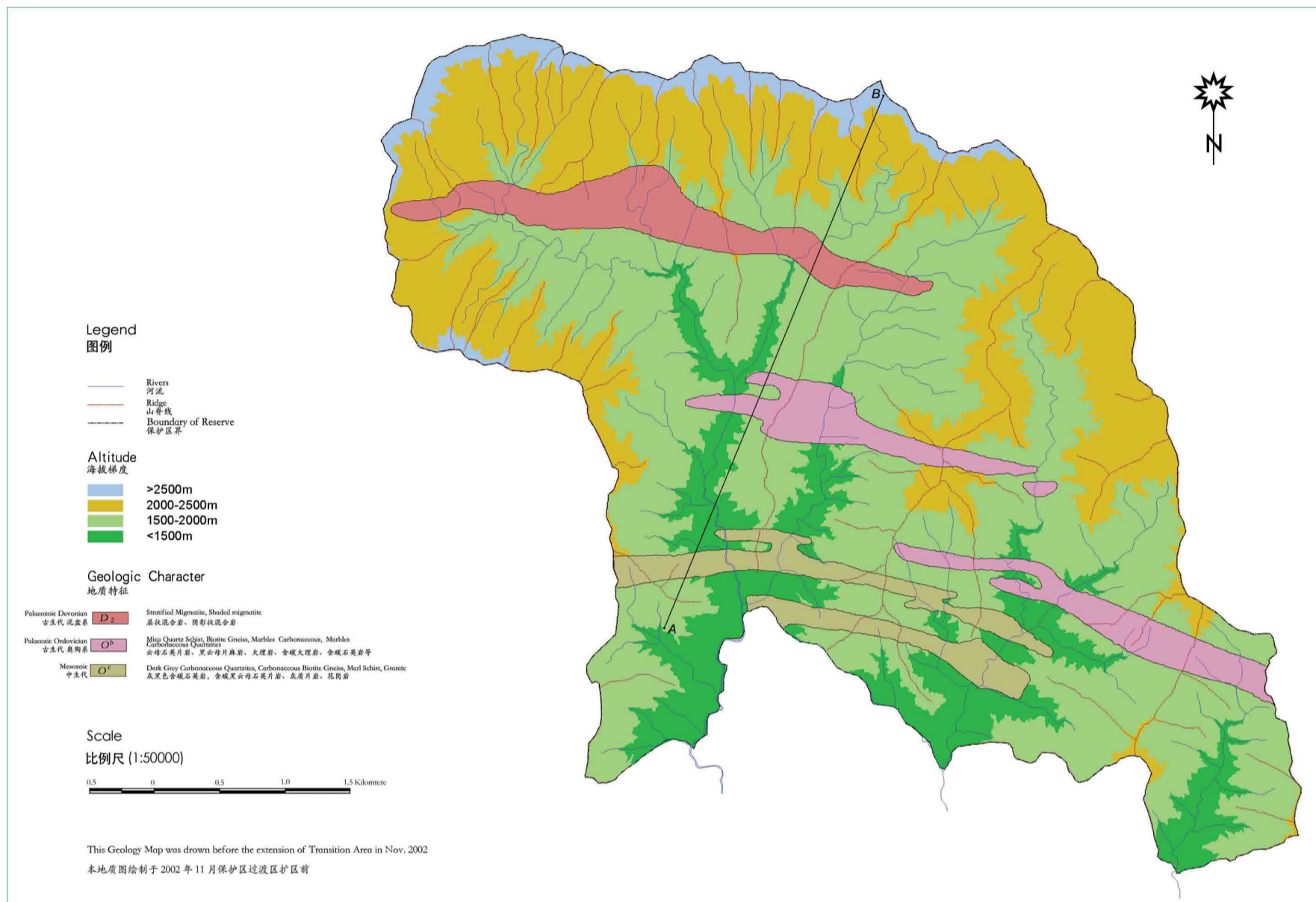
佛坪生物圈保护区核心区面积103.26 km², 缓冲区61.39 km², 过渡区559.78 km²。佛坪保护区核心区与周边陕西省长青自然保护区、周至县老县城保护区、西安市周至保护区的核心区连成一片, 加强了整个区域的管理。2002年11月特大水灾过后, 人们更加认为设立保护区是保护自然环境最有效的措施, 政府将原有的137 km²的过渡区扩大至现在的559.78 km², 目前保护区的总面积占到了佛坪县总面积的57%。

核心区是佛坪保护区自然生态系统保存最原始、受人为干扰最小的区域, 也是大熊猫等珍稀濒危物种的集中分布地, 严禁任何外界单位和个人进入; 缓冲区对核心区起缓冲作用, 保护对象分布较多, 自然生态系统较完整, 以原生生态系统为主, 伴有少量演替过渡的次生生态系统, 只允许从事限制性的科研及调查观测活动; 过渡区是保护区内人为活动相对频繁的区域, 自然生态系统已不完整, 区域内允许开展科学实验、教学实习、参观考察、科普生态旅游、野生动植物的繁殖驯化及其它有益资源的合理利用, 但要严格防止外来物种入侵对保护区原有动植物种群遗传基因的污染与影响。



Located in the Qinling Mountains, Foping Reserve is high in northwest and low in southeast. The majority of the park is between 1,000 - 2,500m, with the highest point being 2,904m, and the lowest 980m. The main topographic features are mountains and valleys, and with the increase in elevation the topography changes. Below 1,500m there are mainly valleys but between 1500-2000m there are dales, deep-cut riverbeds, circular mountains and gentle ridges. Above 2,000m there are more dales and mountain ranges. Medium and small-sized topography is imbedded between big landscapes. For example, the Colluvial deposit formed under gravity topography, river terraces, small Diluvial fan of debris flow, stone shoal on riverbeds and potholes are commonly seen among the strings of pearl-like river valleys.

佛坪保护区属于秦岭山地区、秦岭南坡中山亚区。区内西北高东南低，海拔高度一般在1000—2500m之间，最高海拔2904m，最低海拔980m，相对高差1924m。保护区主要地貌类型可分为山岭系统和沟谷系统，而随着海拔高度的增加，各地段地貌类型组合又各具特色。海拔1500m以下，以峡谷峰岭地貌为主；海拔1500—2000m之间，以宽谷深切河床及浑圆状山头与缓梁地貌为主；海拔2000m以上，以宽谷峰岭地貌为主。大的地貌类型中点缀着十分发育的中、小型地貌，如海拔1500m以下平面呈“串珠状”的沟谷系统中，随处可见重力地貌发育下的崩积物；阶地、小泥石流扇、河床上的石滩、壅穴等也比比皆是。



地质年代表 (部分)
Geochronologic Chart (part)

代	纪	世	距今约 (百万年)	主要生物演化	构造阶段	
Era	Period	Epoch	Million Years Ago	Evolution of Major Life-Forms	Orogeny Phase	
新生代 Cenozoic	第四纪 Quaternary	全新世 Holocene	现代 Present	现代植物 Modern Plants	喜马拉雅期 Himalayan Phase	
		更新世 Pleistocene	0.01	人类时代 Age of Man		
		上新世 Pliocene	2.4			
	第三纪 Tertiary	中新世 Miocene	5.3	哺乳动物 Mammals		
		渐新世 Oligocene	23			
		中新世 Eocene	36.5	种子植物 Angiosperms		
		古新世 Paleocene	53			
		白垩纪 Cretaceous	65			
		侏罗纪 Jurassic	135	爬行动物 Reptiles		
		三叠纪 Triassic	205	种子植物 Gymnosperms		
中生代 Mesozoic	二叠纪 Permian	晚 Late	250		燕山期 Yanshanian Phase	
		早 Early	135			
	石炭纪 Carboniferous	晚 Late	290	两栖动物 Amphibians	印支期 Indosinian Phase	
		早 Early	205			
	古生代 Palaeozoic	泥盆纪 Devonian	晚 Late	355	蕨类 Pteridophytes	(海西) 华力西期 Variscan Phase
			早 Early	410		
		志留纪 Silurian	晚 Late	438	鱼类 Fishes	
			早 Early	510		
奥陶纪 Ordovician	晚 Late	438	藻类 Algae	加里东期 Caledonian Phase		
	早 Early	510				
寒武纪 Cambrian	晚 Late	510	无脊椎动物 Invertebrates			
	早 Early	570				

1. The divisions of stratum layers correspond to the geologic time system: Eon, Era, Period, Epoch
宇、界、系、统的地层纪录分别对应地质年代的宙、代、纪、世。

2. The stratum layers of lower, middle and upper correspond to geologic time early, middle and late in the chart.
下、中、上的地层单位对应早、中、晚的地质时间

Foping Reserve is formed by the southern Qinling Indo-China Miogeosyncline fold belt, which is one of the Qinling fold belts. And main body of the reserve is part of the Tongde-Wudu, sub-area of south Qinlin, the Bayankala-Qinlin Stratum. Acid granites are exposed throughout the area in the reserve, and Metamorphic rocks are seen in parts. Periglacial landforms are found above 2,700 m, and quaternary accumulation is seen on river basins and riverbed terraces, including: Colluvial deposits and landslide accumulations of sandy gravel, fine sand, and silt clay.

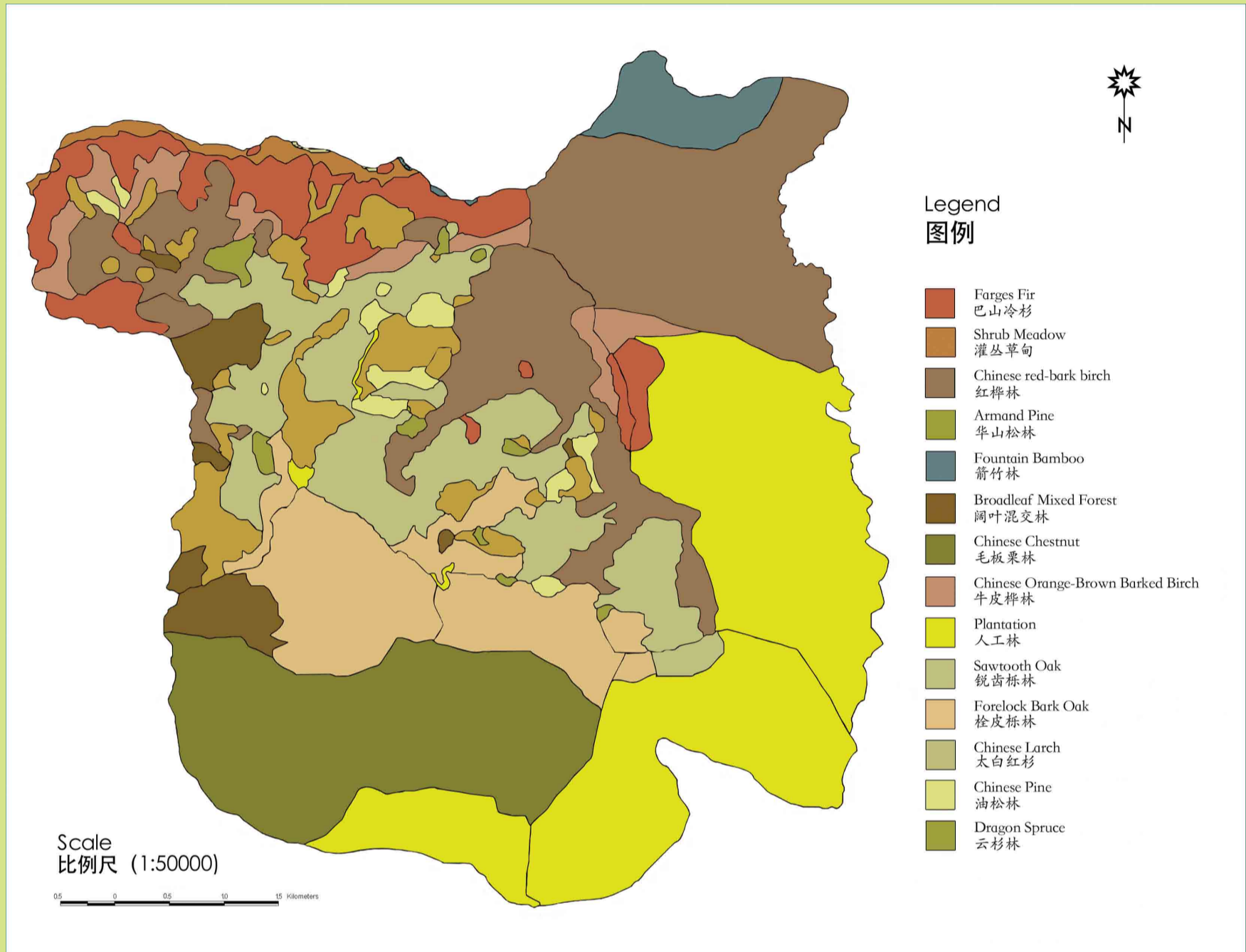
The erosion & denudation of the Middle-mountain physiognomy made the deep valleys and high mountains with slopes of around 30°. Based on geological characteristics and elevation, the reserve can be divided into three parts (from high to low): 1) The largest area: Steep slopes and wide valleys at the upper of the Middle-mountain erosional granite in north and northwest above 2,000m; 2) The second large area: The mesa on slow slopes and broad valleys at the middle of Middle-mountain erosional granite between 1,500 to 2,000m, mainly distributed at Sanguanmian, Xihe Daping, Zaoyang Ping and the surrounding area. 3) The steep slopes and narrow valleys at the bottom of the Middle-mountain erosional granite below 1,500 meters, in the south part of the reserve and down stream of the rivers in southeast, which is the smallest area in total.

The ancient geology of the reserve provides good conditions for biodiversity enrichment, and the continuous mountains and valleys have become "secret cradles" for endangered wild plants and animals.

佛坪保护区内的地质构造属秦岭褶皱系南秦岭印支冒地槽褶皱带。地层主体是巴颜喀拉-秦岭地层区南秦岭地层分区中同德-武都地层小区的一部分。由于印支期岩浆活动强烈，区内酸性侵入花岗岩广泛出露，仅在局部地段有变质岩出露。冰缘地貌裸露在海拔2700m以上，河谷盆地内及河床阶地上则主要聚集着第四纪堆积物，其中以崩积物、泥石流堆积物和洪积物为主，由巨砾、砾、砂、粉砂和粘土构成。

保护区内的侵蚀剥蚀中起伏-大起伏中山地貌，呈现出地表起伏剧烈，谷深山高，坡度多在30°左右。按地质特点和海拔高度，保护区地貌自上而下可分为：(1)面积较大、海拔在2000m以上的侵蚀剥蚀花岗岩中山上部的陡坡、宽谷峰岭区，主要分布在区内北部和西北部；(2)面积居次、海拔在1500~2000m之间的侵蚀剥蚀花岗岩中山中部的缓坡宽谷平梁区，主要分布于三官庙、西河大坪、枣阳坪及其周围地区；(3)面积较小、海拔在1500m以下的侵蚀剥蚀花岗岩中山下部的陡坡峡谷区，主要分布于保护区南部和东南部各条河流的下段。

佛坪保护区内古老的地质成分为植物生长提供了优越的生长条件，催生并促进着这里的生物多样性，绵延的大山是这里珍稀野生动植物繁育、栖息的“神秘摇篮”。



Being a part of the China-Japan Forest Plantage, the vegetation in Foping reserve is a mix of old and new species as well as species from both the north and south of China. The dominant forest vegetation of lower Middle-mountain Forest Vegetation consists of species from of mid, northern and eastern China mixed with a small number of endemic species of western China and Qinling . The sub-tropical shrubs and meadows are mainly Tangut element and China-Hymalaya. The vegetation of the reserve can be divided into 4 types: conifer, broad-leaved forest, shrub and meadow, and includes 29 international monophyletic genus, 107 genus endemic to east-Asia and China, 18 species endemic to only China, and 85 species endemic to only Qinling. Among the seed plants, 392 of the sub-tropical genus account for 71% of the total number in the reserve, while the other 25% is 135 tropical plants. We can also find a large number of the tertiary relic species in the reserve; *Pterostyrax psilophylla* Diels ex Perk (*Pterostyrax psilophylla* Diels ex Perk), *Eucommia bark* (*Eucommia ulmoides* Oliv), *Spur leaf* (*Tetracentron sinensis* Oliv), *Saruma henry* Oliv are all examples.

The three vertical vegetation belts in Foping Reserve include: 1) A typical lower Middle-mountain deciduous broad-leaved forest belt (Oak forest belt) below 2,000m. 2) Middle-mountain deciduous broad and small-leaved forest belt (Burch forest belt) between 2,000 to 2,500m. 3) Sub-alpine conifer forest belt (Farges fir) above 2,500m. The different vertical vegetation belts are closely related to climate and soil, and at the same time interact to each other. A unique microclimate has been created by the reserve unique geology and vegetation, this microclimate influences the succession of vegetation. Think of the influence among vegetation, soil, topography and hydrology, who can imagine there are such huge changes going on hidden in the quiet forest?

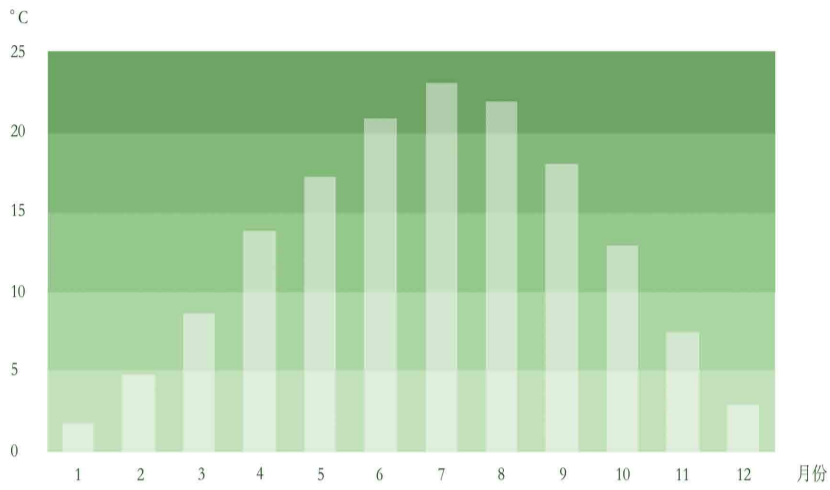
佛坪保护区内的植被特点是南北过渡，四方杂居，起源古老，新老兼备。本区属中国—日本森林植物区系的一部分，低中山森林植被优势植物以华中、华北及华东成分为主，并有少量的华西和秦岭特有成分；亚高山灌丛及草甸则主要由唐古特成分及中国—喜马拉雅成分构成。本区植被可分为针叶林、阔叶林、灌丛、草甸等4个植被型组。其中包括29个世界性单种属，107个东亚和中国特有属，18个中国特有种，秦岭所有85个特有种。种子植物中，温带分布类型392属，占总数的71%；热带分布类型135属，占总数的25%；属的地理成分以北温带分布类型为主，具有明显的热带、亚热带性质；种的地理成分以华中为主，兼杂华北、东北、蒙古和青藏高原成分。在保护区内还可见到众多古老的第三纪孑遗物种，如白辛树(*Pterostyrax psilophylla* Diels ex Perk)、杜仲(*Eucommia ulmoides* Oliv)、水青树(*Tetracentron sinensis* Oliv)、马蹄香(*Saruma henry* Oliv)等。

佛坪保护区内的三个垂直植被带包括：(1) 海拔2000m以下的低中山典型落叶阔叶林带(栎林带)；(2) 海拔2000—2500m之间的中山落叶阔叶小叶林带(桦林带)；(3) 海拔2500m以上亚高山针叶林带(巴山冷杉林带)。各垂直植被带与特定的山地垂直气候带、土壤带紧密联系，相互作用。地形和森林植被的影响，形成了保护区内显著的山地森林小气候，气候条件作为主要因素推动着植被间的演替，植被的演替又潜移默化地作用于土壤、地貌、水文。谁又会想到静静的森林中如此的瞬息万变？

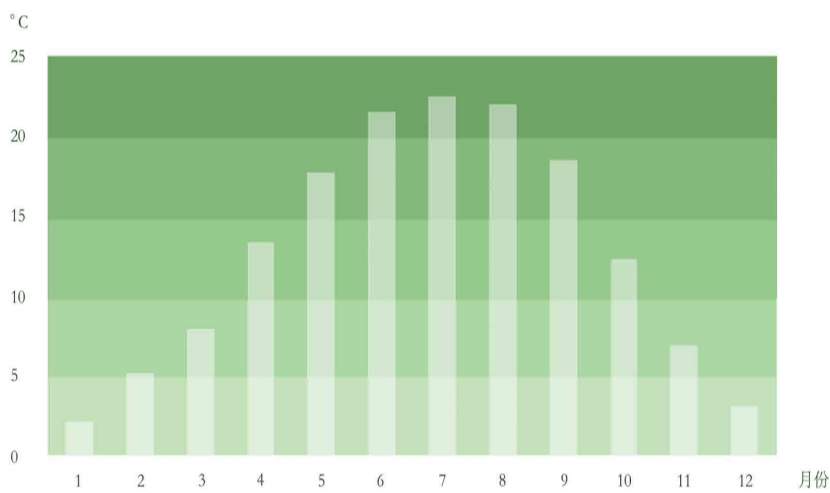


The Climate Charts of Foping Biosphere Reserve

佛坪生物圈保护区气候图



Average monthly temperature of Foping Biosphere Reserve (2005)
佛坪生物圈保护区 (2005) 月平均气温



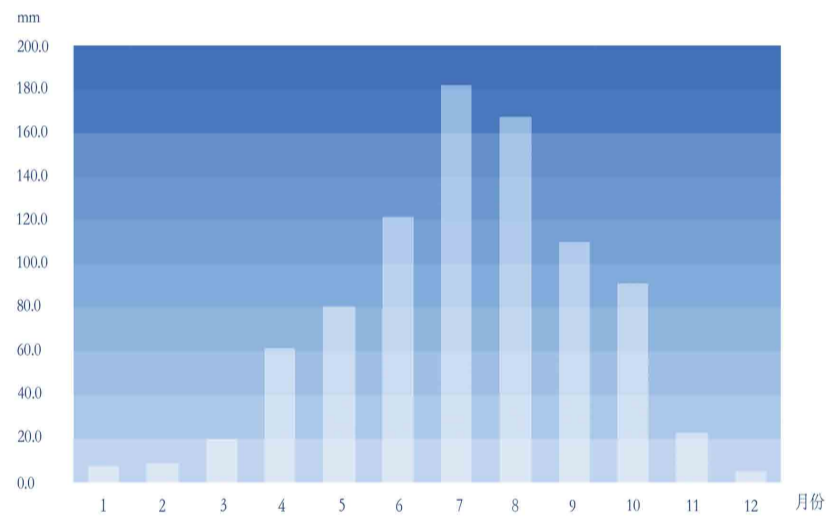
Average monthly temperature of Foping Biosphere Reserve (1998-2005)
佛坪生物圈保护区 (1998-2005) 月平均气温

高大的秦岭山阻挡了北方干冷气流的南侵，而东南暖湿季风可沿长江、汉水长驱直入，佛坪保护区内则形成了属北亚热带向暖温带过渡的山地暖温带气候。区内大部分地区温暖湿润，冬无严寒，夏无酷暑，本区大熊猫等珍稀动物的繁衍生息和生物多样性的发展完全依赖这样优越的气候条件。

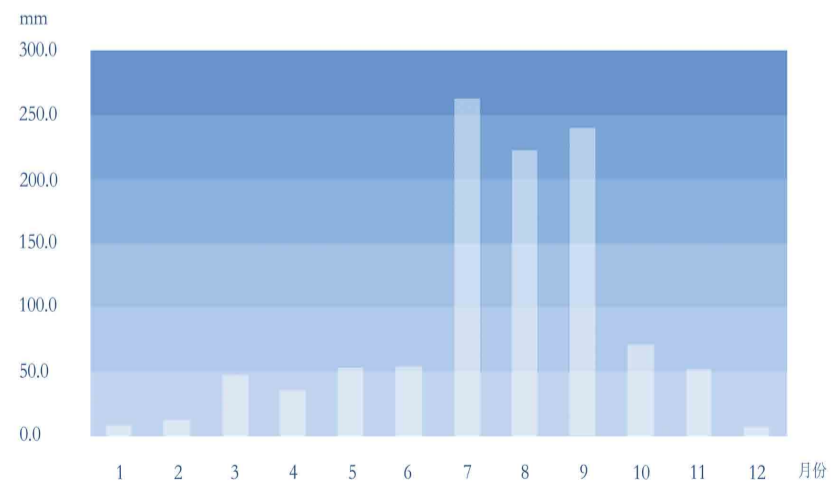
佛坪保护区气候冬春长，夏秋短，并且随海拔升高而夏季愈短，冬季愈长。年均日照1726.5小时，年总辐射105.12kcal/cm²，年均温11.5℃，极端最高温37℃，极端最低温-12.9℃，气温垂直差异大，随海拔升高而降低。南部低山区年均温13.4℃，北部海拔2000m年平均气温6.4℃，年均降水量924mm，年最大降水量1382.3mm，年最小降水量603.8mm；夏季降水量最多而冬季最少，每年7-8月中旬和9月上旬为降水高峰期；年均降水日数131.1天；极端降水强度117.1mm/日；降水地域分布自东南向西北及随海拔升高而递增，南部岳坝周围年均降水量1044.3mm，保护区内海拔2200m以上年均降水量大于2000mm；年均蒸发量1086.3mm；每年早霜始于11月上旬，晚霜终于3月下旬，年均无霜期约220天；降雪初日一般在10月，在三官庙保护站一带最早记录为9月25日，保护区内积雪终日一般在3月底，最晚在4月底。

Qinling Mountain's height blocks dry and cold air in the north from coming to the south, while the warm and wet monsoon of southeast pushes its way directly along the Yangtze and Han Rivers. Hence the climate of the area ranges from sub-tropical to warm. Most areas of the reserve are warm and wet and as the reserve does not have the extremes of a bitter winter and very hot summer. It is an perfect climate for endangered species like the Giant Panda as well as the development of biodiversity.

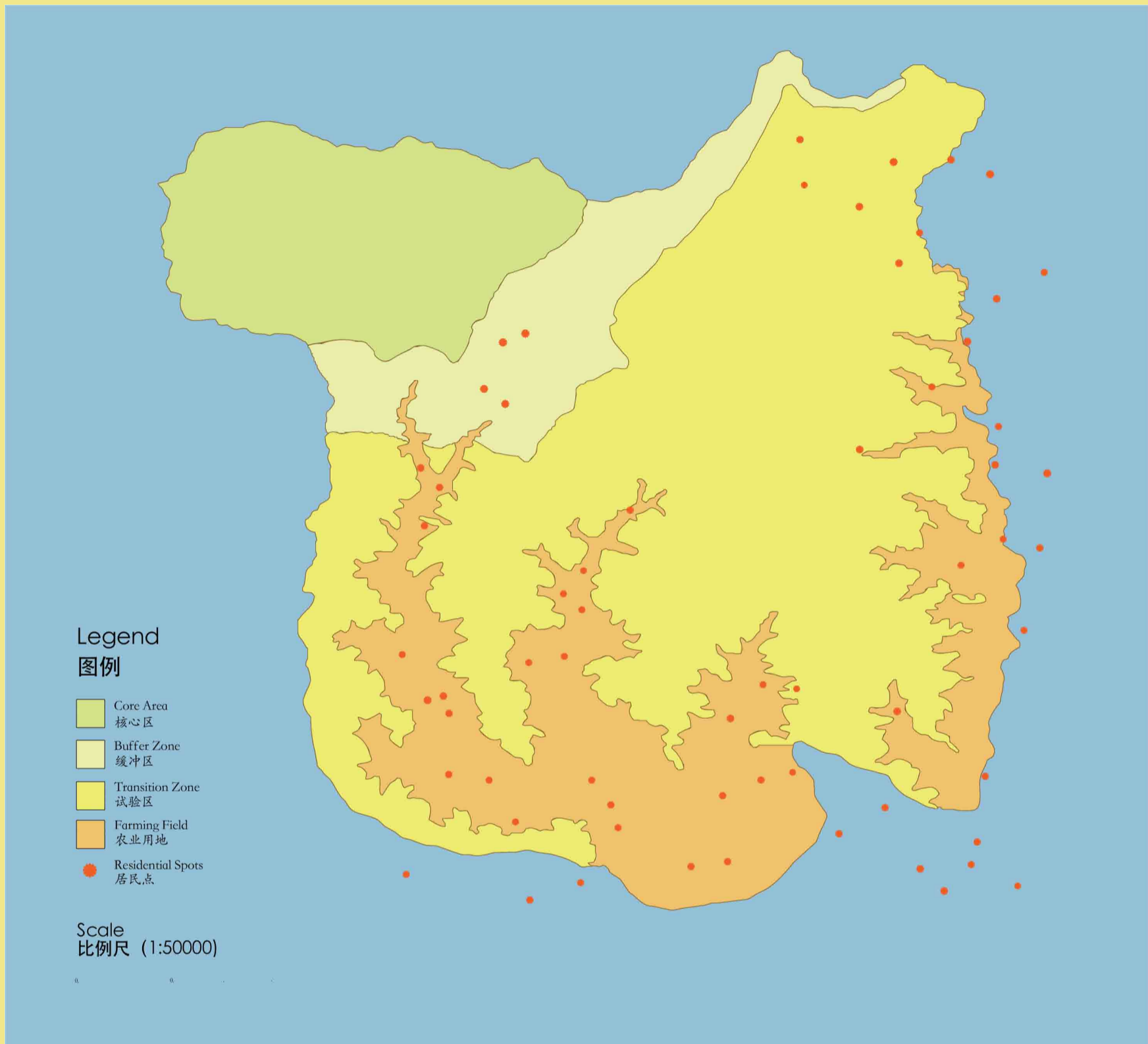
Spring and winter are long in the reserve while summer and autumn are short. Additionally, the higher the altitude is, the shorter the summer and longer the winter lasts. Annual average sunlight is 1,726.5 hours, and annual radiation is 105.12 kcal/cm². The average temperature is 11.5 °C with the highest is 37 °C and lowest -12.9 °C. Temperature varies depending on the elevation, the higher the altitude, the lower the temperature. The average temperature of the low mountains in the south is 13.4 °C, while it's 6.4 °C in the north at 2,000 meters. Average annual rainfall is 924 mm, the highest level recorded was 1,382.3 mm and the lowest 603.8 mm. Most of the precipitation happens in summer with the peak from July to September. Annual rainfall period is 131.1 days, and the highest rate of precipitation is 117.1 mm per day. Precipitation increases with raise of the elevation from the southeast to northwest. The precipitation around Yueba is 1,044.3 mm, and the annual average rainfall is over 2,000 mm. of the places in the reserve with altitude above 2,200m. Annual evaporation is 1,086.3 mm, the frost starts in early November and ends in late March. The annual non-frost period is 220 days. Snow arrives in October, and the earliest recorded snowfall was September 25th at Sanguan Miao Management Station. The snow usually completely melts by the end of March, April at the latest.



Average monthly rainfall of Foping Biosphere Reserve (2005)
佛坪生物圈保护区 (2005) 月平均降水量



Average monthly rainfall of Foping Biosphere Reserve (1998-2005)
佛坪生物圈保护区 (1998-2005) 月平均降水量



Level and terraced fields are scarce in the reserve. Additionally the slopes are too steep and not suitable for cultivation. Therefore, most of the population is living in townships or on the level areas around the riverbeds. There are two trails inside the transitional zone that are suitable for vehicles, while there are no roads in the core and buffer zones. Most people live in areas connected by the roads, few live in remote areas so in general where remain undeveloped.

The main land-use is agriculture and is mostly confined in the transitional zone. Rice is the main crop below 1,100m where paddies are found on the vale plain. Where the rice is grown, the higher the elevation, the lower the yield. In Yueba and Longtan (below 1,000 meters), wheat and cole are interplanted after the rice reaped. Dry lands are also found on two banks of the riverbed between 1200-1,400 m. In this area the ground is either level or of a slope under 25 degrees. Corn, beans and yams are planted. Yields on level ground are stable and increasing, while yields are decreasing on the slopes and soil erosion is common. There are 0.05km² of paddy fields in Daguping Village, which is at the intersection of West River and East River and the Xiahe Village. Sanguan Miao Village doesn't have any paddies and have 0.25km² of dry lands, among which 0.22km² are leveled fields and 0.02km².

Due to the fact that temperature decreases as elevation increases, and based on historical records of the vertical population distribution, it's apparent that 1,400 meters is the limit for agricultural activities. Therefore, subtropical and cool-temperature zones on mountains of over 1,400 meters are the last remaining home for endangered species such as the Giant Panda (*Ailuropoda melanoleuca* David).

佛坪保护区内适于耕种的坪地、坝地十分稀少，坡地则陡峭贫瘠，不利耕种，因此，本地区人口相对集中在中心城镇或河谷平地。保护区过渡区内有两条林区便道可通汽车，而核心区和缓冲区内不通公路，仅以步行道连接。区内居民点和土地利用也受交通影响，汽车通行的区域居民密集，土地多已开发利用，而未通公路的区域则人口零星分布，土地利用强度也很弱。

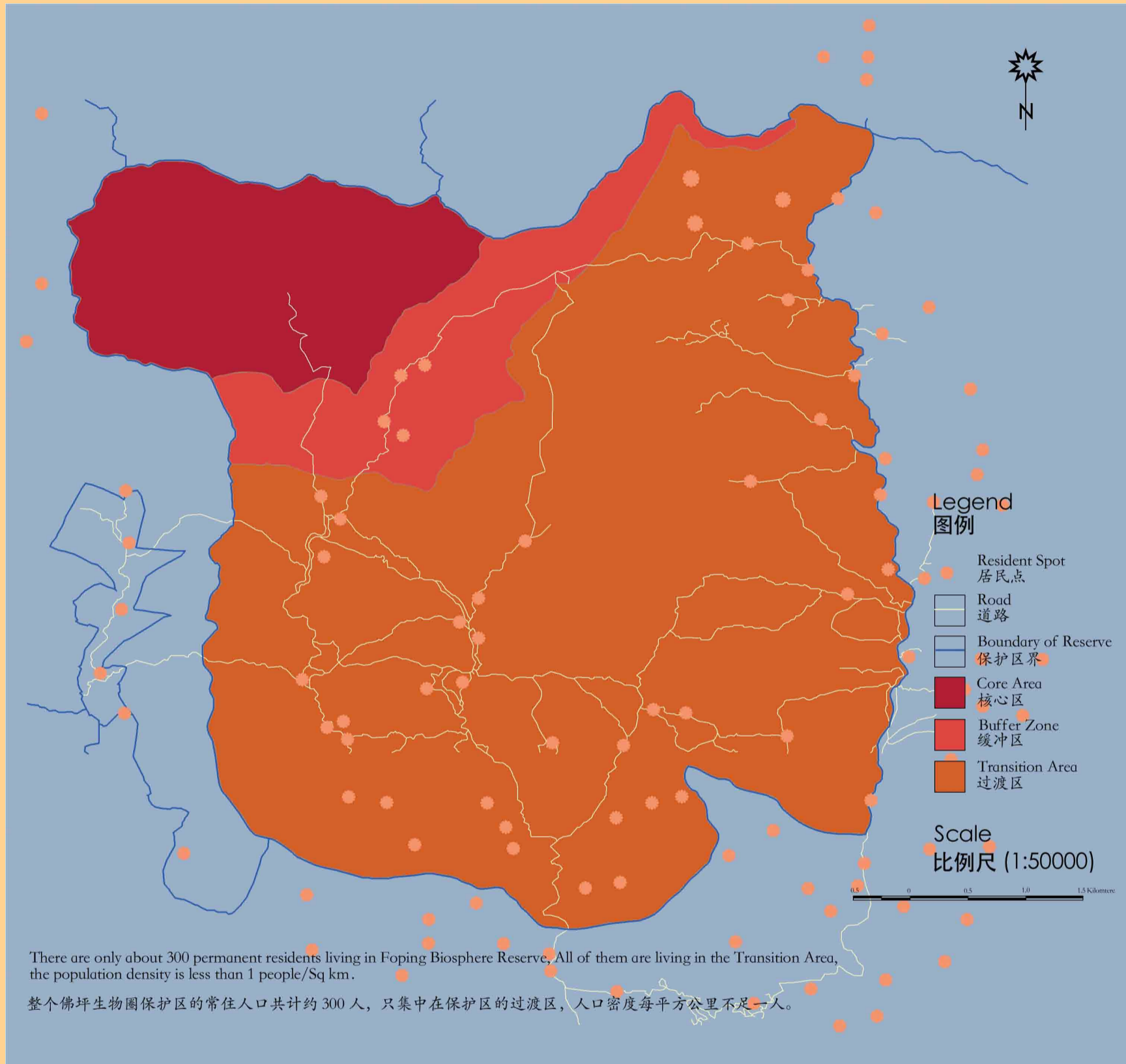
本区土地主要土地利用方式为农耕地，而且只相对集中分布于过渡区中。农耕地包括水田和旱地。水田分布在海拔1100米以下的河谷地带，主产水稻，产量较其它农作物高且稳定，并随海拔下降产量增高。在岳坝、龙潭海拔1000米以下地区，水稻收割后还可套种小麦和油菜。旱地分布在海拔1400米以下的河谷两侧，多为25度以下的缓坡地或平地，在海拔1200米以上分布面积较多，以种植玉米、大豆、薯类为主。平地产量高而稳定，坡地产量低，并易引起水土流失。大古坪村有水田0.05平方公里，主要分布在西河与东河交汇处和下河小组，三官庙村民小组没有水田。旱地0.25平方公里，其中平缓地0.22平方公里，坡地0.02平方公里。

根据佛坪地区气温随海拔高度的上升而逐渐下降的特征，以及现有农耕地和居民点的垂直分布和历史遗址分布的状况不难看出，海拔1400米是这里农业活动的海拔上限。而海拔1400米以上的山地温带和寒温带地区则成为当代大熊猫(*Ailuropoda melanoleuca* David)等珍稀动物最后的家园之一。



The Population Density Map of Foping Biosphere Reserve

佛坪生物圈保护区人口密度图



There are 8,018 people in 2,170 households and 79 village communities in 21 villages, as well as 4 townships in the reserve. 54 people in 12 households live in the only village communities in the buffer zone (0.7%), while the remaining 7,964 residents (2,158 households) live in the transitional zone (99.3%). The population density is 14.2 people per km² in the transitional zone. Most of the population lives in the valley townships and Sanguan Miao is the highest community located at 1,500m. In the history, most people here rely on agriculture and grain production does not often reach subsistence levels. Since the late 80s, the local government and the reserve have been promoting scientific ways to improve the condition of the soil. They have also built water infrastructure, introduced high-yield grain seeds and proper fertilizers; this has increased the grain output by 3 times. Annual grain output has reached 400 kg per person, and in general meets the needs of living and animal husbandry. Population in the area has been declining in recent years.

The local economy is still very under-developed compared with other areas, hence there are still a conflict among conservation, traditional living style and demand for natural resources to develop economically. Plantation and introduction of non-indigenous trees had resulted in some species invaded the areas and pollution of genes, in addition illegal hunting still occurs. The issues of most concern for the population of the area are, how to live and what means of production to use to support themselves and their chosen lifestyle.

保护区地域共涉及到1个县4个乡，21个行政村，79个村民小组（以自然村划分），2170户，8018人。其中居住于缓冲区的居民为1个村民小组12户54人，占总人口的0.7%；居住在过渡区内的居民2158户，7964人，占保护区总人口99.3%，人口密度为14.2人/km²。人口集中分布在河谷两侧和乡镇附近，最高分布在海拔1500米（仅三官庙组）。经济结构以传统农业为主，种植业和养殖业为副。历史上一直是靠天吃饭，广种薄收，亩产很低，每年所产粮食不足以温饱。从80年代后保护区与当地政府的密切配合，通过大力推广农业科学技术，改良土壤，兴修水利，引进良种，合理施肥等措施，将农作物产量提高至三倍以上，人均产粮达到400公斤，基本解决了农民的吃粮和养殖业的饲料问题。近年来，区内人口数量已呈现下降趋势。

由于当地社区经济还不发达，与区外的经济收入差距悬殊，生活十分贫困，铁可匠间接的思想和资源利用方式与自然保护区保护工作之间的矛盾仍然存在。人工造林引进外来树种造成了外来物种入侵，导致了遗传基因污染；盗猎野生动物的事件仍时有发生，人口的密度和当地百姓采取什么样的生产、生活方式仍旧是保护区关注的核心本土问题之一。

The Pictures of Most Important Flora & Fauna of Foping Biosphere Reserve

佛坪生物圈保护区典型动植物区系

1	4
2	3
5	6



(1) Giant Panda (*Ailuropoda melanoleuca*)

Nicked as "Flower bear", or "bamboo bear", the Giant Panda is the national treasure of China, and first level key protected and endangered species. It's only seen in three provinces of Sichuan, Shaanxi, and Gansu, and is labeled as "living fossil" and flagship of international conservation. It lives in bamboos and forests, and is also called "hermit of the bamboo".

Giant pandas are meat-eating but mainly count on bamboos and other plants. Bamboo shoot is their favorite as it's easy to be digested. From spring to autumn, pandas migrate from medium high to high mountains to look for different bamboos and bamboo shoots at different elevation. Sometimes panda also eats other plant and even animal bodies or prey for small animals, but it's still a mystery why it chose to be vegetarian at the end. The area that pandas live in Qinling is 5 to 15 km².

Panda population in Foping reserve accounts for 35% of the total of Qinling, and mainly seen in core and buffer zone of the reserve. Among them, Xihe and Sanguanmiao are with the most intensive population, and one panda is seen in every 1.5 km². Through years of conservation, panda population is on the rise, and threat from illegal hunting is reduced. At present, the main threats to pandas are from logging of bamboos and shrinking, degradation, and fragmentation of the habitats.

(2) Sichuan Golden Monkey (*Rhinopithecus xaxellanae xaxellanae*)

Sichuan Golden Monkey (also known as sub-nosed monkey) is endemic and as precious as the Giant Panda, and the 1st national level protected animal in China. The monkey has thick lip, blue face and snub nose, and has golden hair from back to tail mixed in grey, especially the male that has 30 to 40 cm golden hair on the back, and that's why they are called Golden Monkey.

The monkey lives in mixed coniferous broadleaved forest and coniferous forest, and stays by families. The strongest male is the leader, and the monkeys appear in the number of 20 to 30, and even 100 to 200. It loves to eat leaves, fruit, melon, bug, bird egg, birds and nuts, and their natural enemy is prey bird and predator. They don't mind of cold but hot weather, usually they move not much at 30 degree in summer but fine at minor 20 in winter.

The Golden Monkey population in the reserve remains stable in the past 10 years; hunting is no longer the threat to it. But lack of public awareness, shortage of scientific input, and the human disturbance that caused fragmentation and shrinking of its habitats are still the main problem to the species.

(3) Takin (*Budorcas taxicolor*)

Takin is China's 1st level national protected animal, and is seen along Qinling, Qionglai Mountain, Liang Mountain, Gaoligong Mountain, and Hymalaya Mountains, and is a large grazer in sub-alpine forest. Takin is as large as a bull, with big head and thick neck, big and round eyes, and can be as tall as 1.8 to 2.1 meters, and as heavy as 230 to 275 kg. Both the male and female have big horns, and bends to outside from the head like a bow, and that's why it's also called "Twist Horn Takin". The Takin in Qinling is with golden hair on the back, and is also called "Golden Twist Horn Takin".

Takin habitats in sub-alpine coniferous forest to alpine meadow, and migrates to lower mountains in winter. They move vertically with the changes of season and vegetation, and have the habits of eating natural salt and alkaline from the pond. They live by communities with numbers from 3 or 5, to dozens or hundreds. They sleep in a big circle, with head inside and tail outwards. Babies and the young will be sleeping in the middle, while the adults stay outside. When moving, they are like disciplined army and climb fast on rocks. The strong male Takin will take the lead, while the female, the elder and the young follow under protection of other males.

Takin population is on rising thanks to conservation efforts, but at the same time the large quantity of Takins also created pressure to the environment such as plants. The main threats to them are from illegal hunting, degradation and fragmentation of habitats.

(4) Herba Asari

It's distributed in Deqin of Yunnan, Emei Mountain of Sichuan, Zhouqu of Gansu, and Qinlin Mountains of Shaanxi, and is China's National-level No. 1 Protected Plant. It grows in damp and cool environment, and in acid and humus rich soil, and can often be seen under the Faber fir forest and Azalea forest. It can be seen from Sanxian Mountain to Guangtou Mountain at 2,700 to 2,800 meters in Foping Nature Reserve, and often appears in small patches and small numbers. Because it's growing in relative high elevation here in Qinling and was found of no direct economic value, the plant is in good status here.

(5) Chinese Yew (*Taxus chinensis*)

Yew is endemic in China and is national-level No. 1 protected plant. It is distributed in Sichuan, west Hubei, north Guangxi, Yunnan, Guizhou, northeast Hunan, Huang Mountain of Anhui, and Southwest of Shaanxi. It is only seen in the Qinba Mountains in south of southern slope of Qinling, and appears in small amount at 1,200 to 2,000 meters in Foping Reserve.

The Paclitaxel Yew contains works against cancer, and driven by profit, many Paclitaxel processing factories were opened in China. Therefore Yew resources were under severe damage by illegal harvest of the Barks. In Foping, Yews are safe thanks to strict protection.

(6) Qinling Faber fir (*Qinling Abies fabrici*)

Qinling Faber fir is national level No. 2 protected plant, and only distributes in mid-west part of China from Shennongjia of Hubei to the south Gansu province. Qinling is the core area of its distribution, and they are found in south slope instead of north. Foping reserve is the core where the tree grows, but not in large numbers. It's not good in natural production, but is very good construction materials and is traditionally used by locals to make coffins. In the long term, it's at the verge of extinction.

Rare and endangered animals:

(1) 大熊猫 (*Ailuropoda melanoleuca*)

大熊猫俗称“花熊”或“竹熊”，属哺乳纲、食肉目、大熊猫科，是中国特有的国家Ⅰ级重点保护珍稀濒危野生动物，仅分布于四川、陕西、甘肃三省，被视为“活化石”、“国宝”，更是全球野生动物保护的标志和旗帜。大熊猫生性孤僻，常分散独栖于茂密的竹林中，故得雅号“竹林隐士”。

大熊猫为食肉目动物，但主要食物却是多种竹类植物，竹笋是大熊猫的“最爱”，它幼嫩多汁，易消化吸收，每年从春到秋，为了吃到不同海拔高度不同种的竹子竹笋，大熊猫的觅食从中山到高山迁徙，叫“赶笋”。大熊猫偶尔也采食其它植物，有时亦捡食动物尸体，或捕捉较小的动物为食。食肉大熊猫为什么会选择“素食”，至今仍令人费解。秦岭大熊猫的年活动面积多在5—15km²，日常活动范围也很小，常年在这样小的空间里活动是为了减少四处觅食所消耗的能量，以维持自身能量的平衡。

佛坪自然保护区内野生大熊猫种群数量约占整个秦岭地区大熊猫数量的35%。大熊猫主要分布于保护区的核心区和缓冲区，其中西河和三官庙区域的种群密度最大，平均每1.5平方公里就分布有一只大熊猫。经过多年的保护，大熊猫种群数量稳中有升，来自偷猎的威胁日渐减小，目前大熊猫生存所面临的主要威胁来自于竹林的砍伐和栖息地的分散、缩小及退化。

(3) 金丝猴 (*Rhinopithecus xaxellanae xaxellanae*)

金丝猴属哺乳纲、灵长目、猴科，是国家Ⅰ级重点保护野生动物，为我国所特有，堪与“国宝”大熊猫相媲美。金丝猴唇层厚而突出，颜面天蓝，鼻孔上仰，故也称“仰鼻猴”。金丝猴颈背至尾基部在浅灰褐色被毛中夹有金黄色长毛，全身毛色艳丽，成年雄性背覆长达30-40公分金色的被毛，尤其在阳光的照射下宛如万缕金丝，因而得名“金丝猴”。

金丝猴栖息在海拔2000—3000米之间的针阔混交林带和针叶林带，过树栖家族生活，一群之中以强壮的雄性为首领，每群少则20-30只，多则达100-200只。喜食多种树叶，兼食各种水果、瓜菜、小昆虫、鸟蛋、小鸟、坚果仁等。金丝猴的天敌为猛禽和食肉动物。金丝猴怕热不怕冷，当夏季气温达摄氏30度时基本不活动或较少活动，冬季常可抵御零下20度的严寒。

保护区内近10多年来金丝猴的种群数量稳定，偷猎或其他原因死亡已经不是金丝猴的种群发展的威胁。现状看似令人乐观，但金丝猴保护的公众认识不足，科研投入相对薄弱以及由于各种人为干扰造成的金丝猴栖息地破碎、缩小将是金丝猴保护的新起点。

(3) 羚牛 (*Budorcas taxicolor*)

羚牛又叫扭角羚或牛羚，属哺乳纲、偶蹄目、牛科，国家Ⅰ级重点保护野生动物，主要沿我国秦岭、邛崃山、凉山、高黎贡山和喜马拉雅山等山系分布，是生活在亚高山森林中的大型食草动物。羚牛体形如牛，头大颈粗，眼大而圆，粗趾敦实，成体体长1.8—2.1m，体重230—275kg，雄性和雌性的头上都有粗大的角，从顶骨后边先弯向两侧，然后向后上方扭转，曲如弯弓，角尖向内，因此得名“扭角羚”。秦岭分布的羚牛体毛略带金色光泽，又有“金毛扭角羚”之称。

羚牛主要栖息亚高山针叶林和高山草甸带，冬季则向低山地带移动。“七上八下九归塘，冬腊月梁嘴上。”反映了它们随气候变化和植物的生长规律作垂直迁移，并在夏季舔食池塘天然盐碱的习性。羚牛营群居生活，少则三五只，多达几十只甚至上百只；群体社会似一个和睦的大家庭，它们睡觉时多围成一个大圆圈，头向外，尾朝内，成体在外，幼仔居中。在行动时，又是一支纪律严明的部队，它们迅速穿越山间林地，善攀爬岩壁，雄壮的“头羚”“一牛当先”，其他雄性则护卫着家族中的老幼成员。

多年来保护区内羚牛种群数量逐渐增加。由于羚牛食量大，集群生活，因此对栖息地环境（如植被）也会造成一定压力。羚牛所面临的主要威胁来自于偷猎和栖息地的片断化和退化。

(4) 独叶草 (*Herba Asari*)

独叶草在全国分布于云南（德钦）、四川（峨嵋山）、甘肃（舟曲）及陕西（秦岭地区），为我国的Ⅰ级重点保护植物。它喜生于阴湿、凉爽和腐殖质特别厚的酸性土壤环境中，巴山冷杉林或金背杜鹃林下常能看到轻柔的身影。佛坪保护区内的独叶草仅分布于海拔2700—2800m间的三仙峰至光头山间及鲁班寨等地；多呈小块状分布，数量极少。由于在秦岭的分布地海拔较高加之也未发现其直接利用的途径，独叶草在这里还可以健康、快乐地生长。

(5) 红豆杉 (*Taxus chinensis*)

红豆杉为我国特有植物，国家Ⅰ级重点保护植物，分布于我国四川、湖北西部、广西北部、云南、贵州、湖南东北部、安徽黄山及陕西南部。在陕西省分布于秦岭南坡以南的秦巴山区。在佛坪自然保护区分布于海拔1200—2000m区域，数量较少。

红豆杉树皮中所含的紫杉醇具有显著的抗癌作用，在经济利益的驱使下，我国各地纷纷办起了紫杉醇加工厂，采剥树皮提取紫杉醇令许多地区的红豆杉资源遭到毁灭性的破坏。但在佛坪自然保护区，严格的保护令这里的红豆杉可以得享安宁。

(6) 秦岭冷杉 (*Qinling Abies fabrici*)

秦岭冷杉为国家Ⅱ级重点保护植物，仅分布于我国中西部的北亚热带向暖温带过渡地区的中山，从湖北的神农架至甘肃的南部，秦岭是其分布的中心地带，而以南坡较多，北坡罕见。佛坪自然保护区又是该种分布的中心地带，但种群数量并不大，呈零星分布。秦岭冷杉的繁殖力较差，同时，因为杉木是较好的建筑材料，且当地有用此木材做棺材的习惯，长此以往，该种的种群数量会很快减少，直至绝迹。

Located in the south of the Guizhou Plateau, Maolan Biosphere Reserve lies in between East Longitude 107° 7' - 108° 8' and North Latitude 25° 7' - 25° 39'. It borders numerous different counties and provinces/regions including: Northeast border - Congjiang and Rongjiang Counties of Miao and Dong Autonomous Prefecture of Guizhou, Southeast border - Huanjiang and Nandan Counties of Guangxi Autonomous Region, West border - Dushan County and North Border - Sandu Shui Autonomous County.

The relic Karst forest ecosystem covers 87.3% of the reserves area, such a large area of pristine Karst forest is rare not only in China, but also in the areas of the same latitude worldwide. With 1,803 plants, 400 vertebrates, 1500 insects and 200 spiders, the Reserve has an extremely high biodiversity value. The Maolan Nature Reserve was established in 1984 and approved as a National Nature Reserve in 1988. In 1996 it was designated a member of the UNESCO World Biosphere Reserve network. The Karst ecosystem provides rich germ plasma resources and is a model for stony desertification control and restoration.

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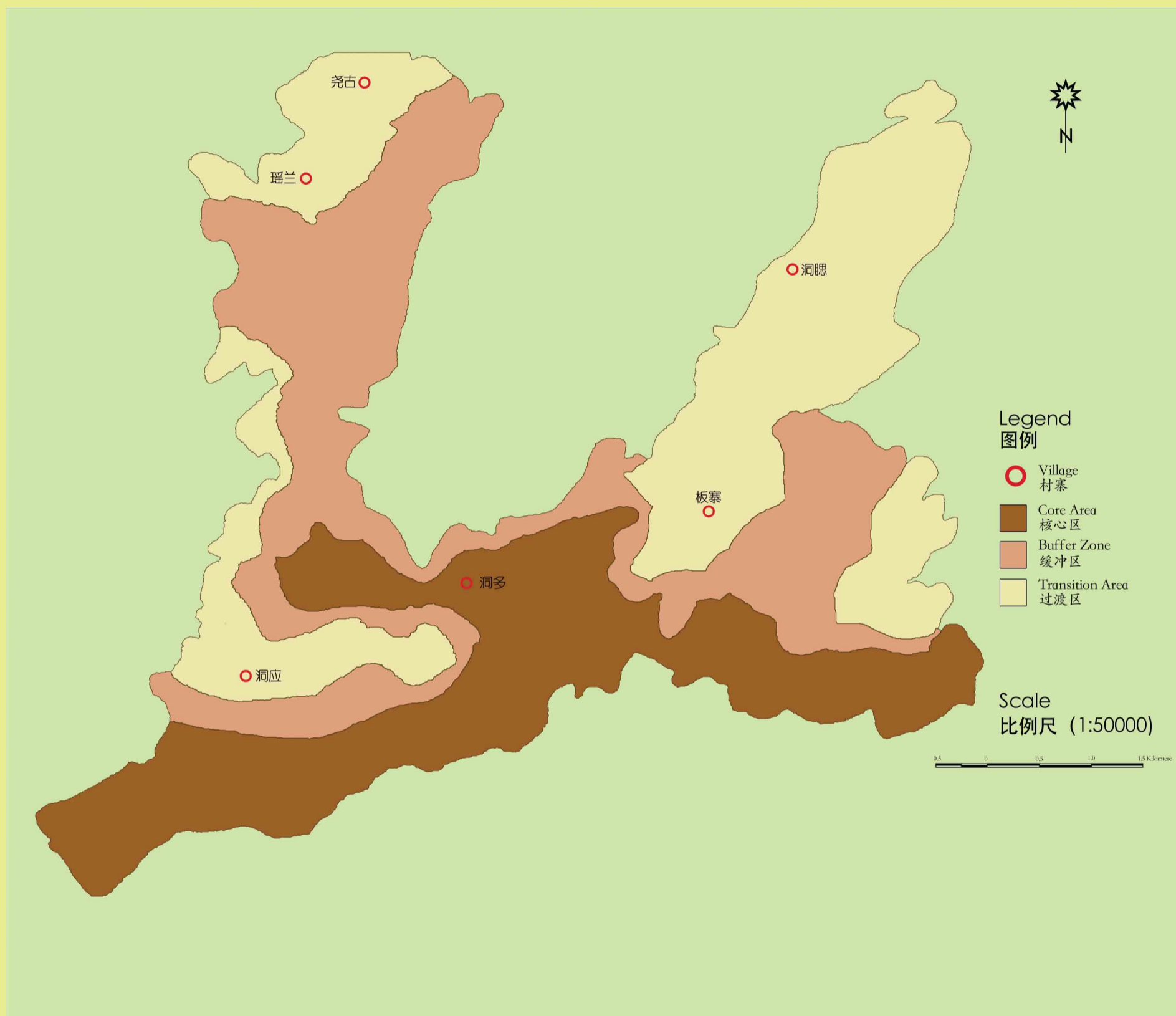
中国茂兰生物圈保护区地处贵州高原南部边陲，位于东经107° 7' - 108° 8'、北纬25° 7' - 25° 39'之间。东北与黔东南苗族、侗族自治州的从江、榕江县接壤，东南与广西壮族自治区的环江、南丹县毗邻，西与独山县相连，北与三都水族自治县交界。

茂兰国家级自然保护区内的亚热带喀斯特森林生态系统，森林覆盖率达87.3%，是地球同纬度地区残存下来的一片面积最大、相对集中、原生性强、相对稳定的喀斯特森林生态系统，林木丰茂，生物资源极为丰富。区内已知的1803种植物，400余种脊椎动物，1500余种昆虫和200余种蛛形纲动物，构建了一个宝贵的生物基因库。始建于1984年的茂兰自然保护区，1988年被国务院批准为国家级自然保护区，1996年被联合国教科文组织批准纳入“国际人与生物圈”保护区网络成员。这里良好的喀斯特生态环境条件为石漠化治理和修复提供了珍贵的种质资源和难得的原始模式。

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茂兰生物圈保护区遥感图



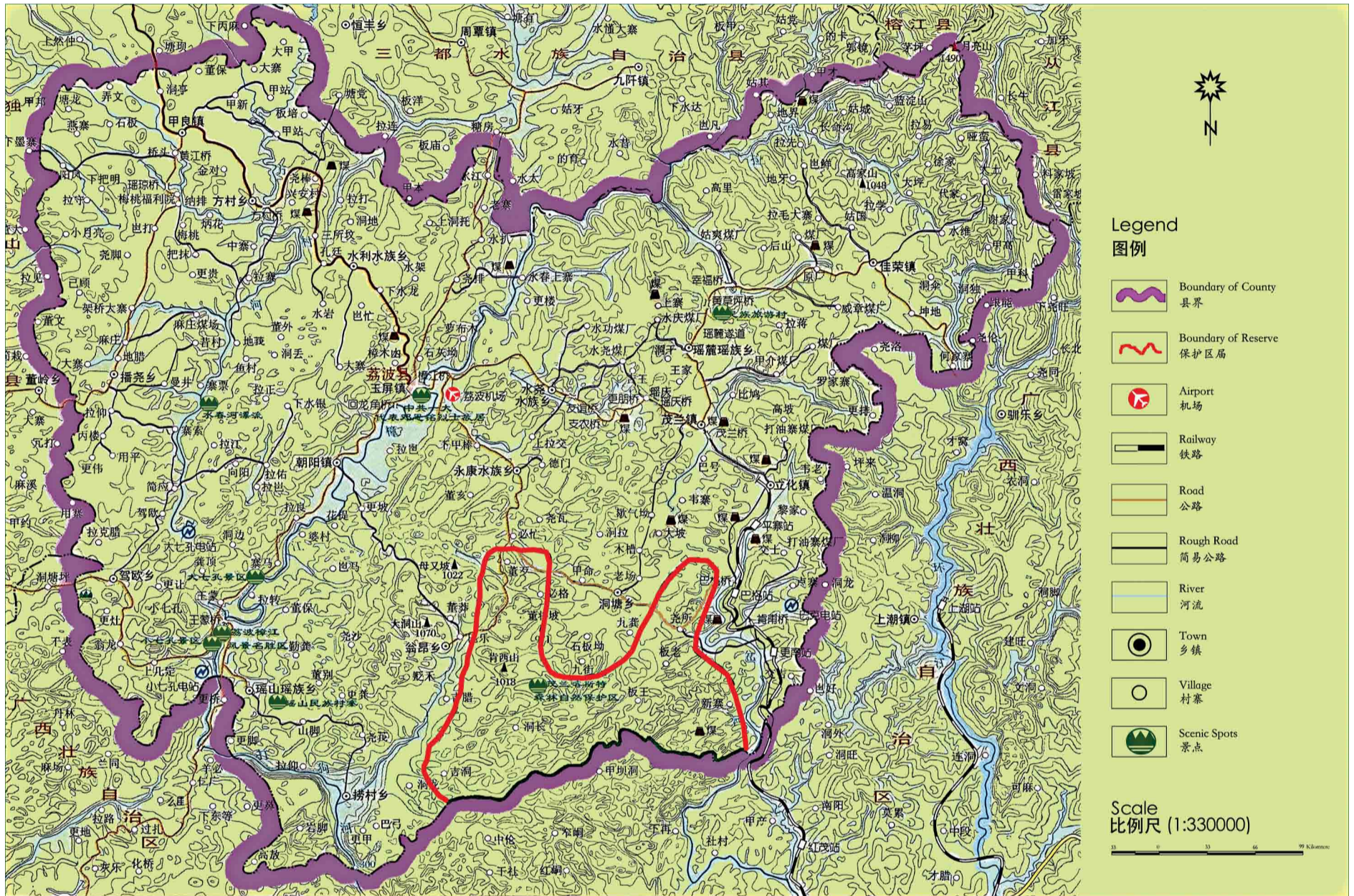


The total area of the Maolan Biosphere Reserve is 212.85 km². The core zone is 83.05 km², buffer zone 81.3 km², and Transition area 48.5 km². The main conservation focus of the reserve is the sub-tropical Karst forest ecosystem and its valuable wildlife resource. The forest coverage of the reserve is 87.3% and that of the core zone is 92%. The huge contrast between the lively Karst forest and its surrounding stony desert make this green piece a natural lab for us to explore the mystery between forest and Karst and ways to control stony desertification.

The core zone is basically a no-man area, only a small population inhabits the buffer zone. Because of sparse traffic, there is little impact to the reserve. While in the transition area, there is a continuing conflicts between development and conservation because of the high density of population and traffic flow.

茂兰保护区始建于1984年，1987年建立省级自然保护区，1988年批准为国家级自然保护区，1996年被联合国教科文组织批准纳入“人与生物圈”保护区网络成员。保护区总面积212.85km²，其中核心区83.05 km²，缓冲区81.3km²，过渡区48.5 km²。主要保护对象为亚热带喀斯特森林生态系统及其珍稀野生动植物资源。区内森林覆盖率达87.3%，核心区高达92%，喀斯特森林生态系统的勃勃生机与周边异化石漠的巨大反差，使这石漠中的“绿洲”成为天然实验室，帮助我们去探索森林与喀斯特关系的奥秘，找寻治理石漠化的方法。

核心区基本为无人区，极少有人为活动的影响，保持了喀斯特森林的原生性特征；缓冲区有部份社区居民居住，但因人口少，交通不便，因而对保护区的影响不是很大，基本处于“人——自然”平衡发展的状态；过渡区为社区居民主要的居住地和生产活动区，人口众多，交通相对便利，保护与发展的矛盾突出，与保护区的冲突很大，是保护区开展各项工作的主要和重点区域。

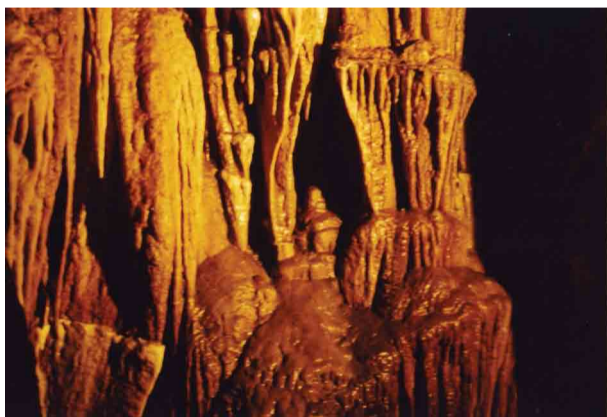
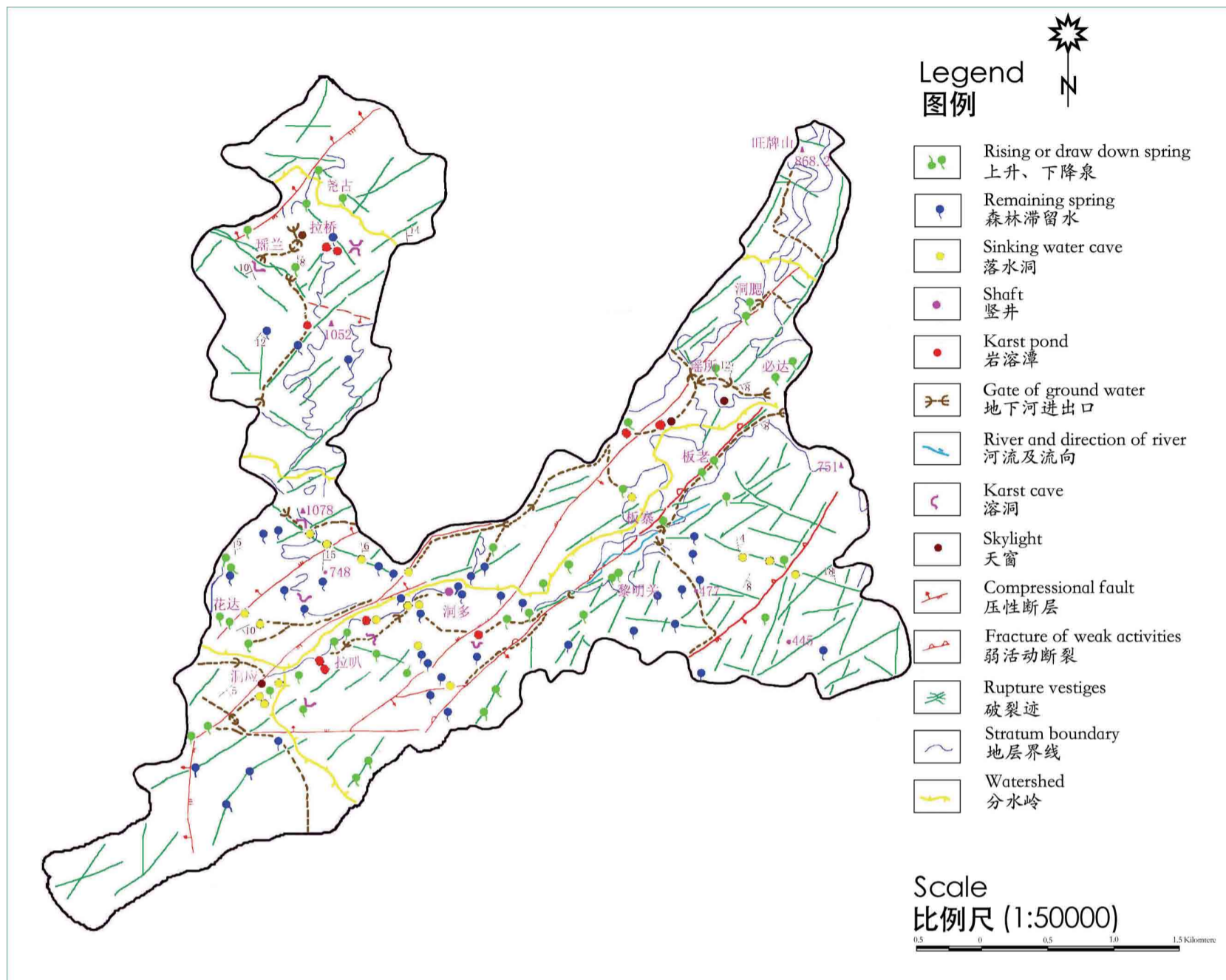


The reserve is located in a broad and cushioned fold structured area in-between the Sancha River in the east and the Zhang River in the west. The land is higher in the west than in the east, with an altitude of 860 to 1,010m in the mountains in the west, and 670 to 800m high in the depression to the east. Mountains in the east are about 650 to 820m, and the depression in the plateau is about 450 to 60m. There are various types of Karst from extruding peaks to deep low lands. Landform types are mainly Karst peak-cluster funnels and Karst peak-cluster depressions, sometimes embedded with ridge-trough, trough valley and basin forms.

The 700m high depression is the widest distributions, and most of it is used for agricultural production. Karst peak-cluster funnels are very important in determining the Karsts landform. Trough valleys are widely seen in the area, and often caused inland inundation during flood season and therefore is suitable for humid-compatible plants.

茂兰保护区处于宽缓褶皱构造控制而成的宽阔河间地带，东濒三岔河，西临樟江。地势西高东低，西部山峰海拔一般为860—1010米，洼地海拔670—800米；东部一般山峰高程660—820米，洼地标高450—600米。喀斯特形态多种多样，锥峰尖削而密集，洼地深邃而陡峭，锥峰洼地层层叠叠。地貌类型以喀斯特峰丛漏斗及峰丛洼地为主，其间点缀着槽谷、盲谷及盆地。

区内高程为700米左右的洼地分布最广，形态宽坦，大部均开垦为良田，为主要的农业生产活动区；峰丛漏斗是决定区内喀斯特地貌（landform）特征重要的地貌类型；盲谷在区内均有分布，雨节时洪水泄不及常酿成内涝，成为适宜耐湿植物生长的有利地形。



Karst cavity 喀斯特溶洞



Stalactite 钟乳石

The Maolan Biosphere Reserve is located on the sloping border between the Yunnan Guizhou Plateau and Guangxi Hills. This area belongs to the Sandu-Libo ancient depression folded fault bundle in southwest Jiangnan Tailong and is an axis edged depression. The geological formations are mainly fold and then fault, the Maolan syndine consists of Permian carbonate rocks which in turn have determined the distribution and layout of stratum and rocks.

In the Paleozoic period, here is the marine transgression area and the main sediment was carbonate rocks of neritic facies. In the Mesozoic period the fold was pushed upward to become land, then continued to mount up in the Cenozoic period and finally became Karst hills and depressions.

The dual ways in which the water retained by Karst forest and Karst water, had clearly shown the hydrographical effect of Karst forest, observably changed the dry Karst land by improving the circulation of surface water and ground water, therefore effectively prevented the occurrence of frequent floods and droughts which occurs in the Karst areas.

四、茂兰生物圈保护区水文地质图

茂兰保护区位于云贵高原向广西丘陵过渡的斜坡地带，在大地构造上隶属于江南台隆西南部的三都—荔波古陷褶断束，处在轴缘拗陷地带。区内地质构造以褶皱为主，断层次之，由石炭、二迭系碳酸盐岩组成的茂兰向斜，控制着这里的地质、岩石的分布及产状。

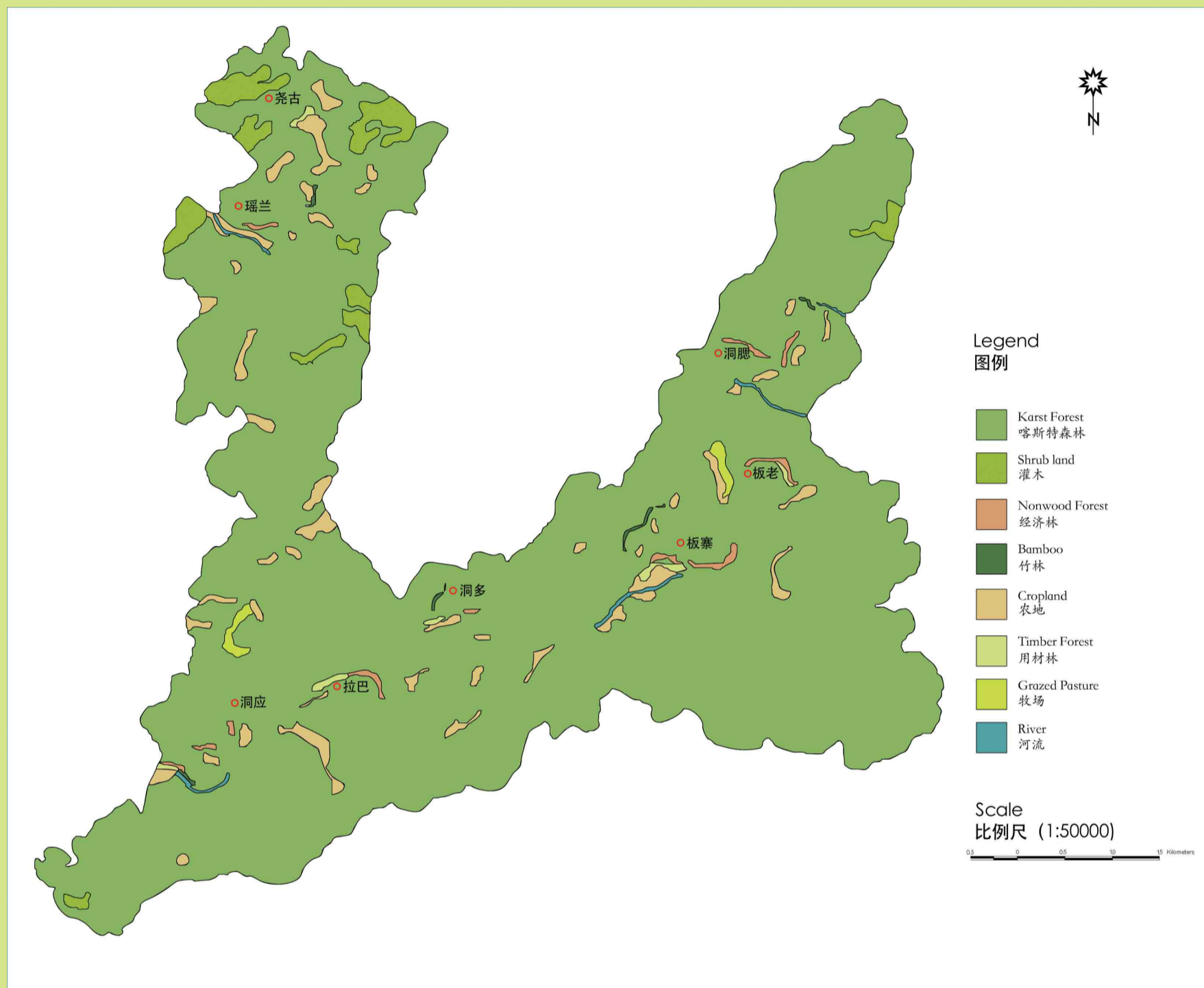
在古生代，这里为海侵区，沉积物以浅海相碳酸盐类为主，于中生代未褶皱隆起，脱离海侵，上升为陆地。新生代造山运动后，持续上升，形成了强烈溶蚀的喀斯特峰林、峰丛和低山山地。

茂兰保护区喀斯特森林滞留水与喀斯特水所组成的水文地质二元结构，极大地改善了地下水及地表水的循环条件，明显地显示出喀斯特森林的水文效应：改变了喀斯特区的干旱面貌，地表水地下水动态较稳定，提高了水土保持的能力，从而有效地防止了一般喀斯特区旱涝交加的频繁灾害。



The Vegetation Map of Maolan Biosphere Reserve

茂兰生物圈保护区植被分布图



Maolan Biosphere Reserve is a sub-tropical evergreen broad-leaf forest. Besides a small amount of wait-a-bit and brushwood, it's a mostly evergreen broad-leaf mixed forest. There are 1803 species in 601 genera of 153 families of sub-tropical and tropical vegetation in the reserve, including evergreen, coniferous and broad-leaved mixed trees, also with bamboo, brushwood, and wait-a-bit.

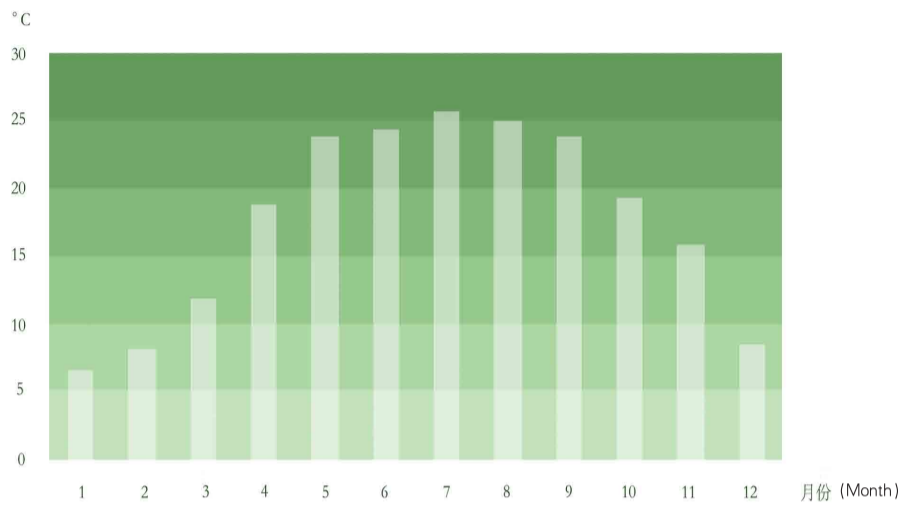
We can see on top and either side of the ridge dominant coniferous and broad-leaved mixed trees like the Kwangtung pine (*Pinus kwangtungensis*), short-leaved Douglas fir (*Pseudotsuga sinensis*), Chinese incense cedar (*Calocedrus maceolepis*), and Yellow-twig keteleeria (*Keteleeria fortunei*). On the lower flat lands with soil, such as the nek and the mountain pass, there are small amount of evergreen broad-leaved trees like Farges evergreen chinkapin (*Castanopsis fargesii*) and *Elaeocarpus chinensis*. In most of the area including different slopes, depressions and funnel bottoms there are deciduous evergreen broad-leaved mixed trees.

Bushes, wait-a-bit and brushwood devoluted by long-time logging, field burning and herding are basically distributed within a 1 to 2 km radius around the village, and mostly are on the bottom of the slopes and depressions. Because of human disturbance, it's hard to restore a naturally generated environment especially for the brushwood.

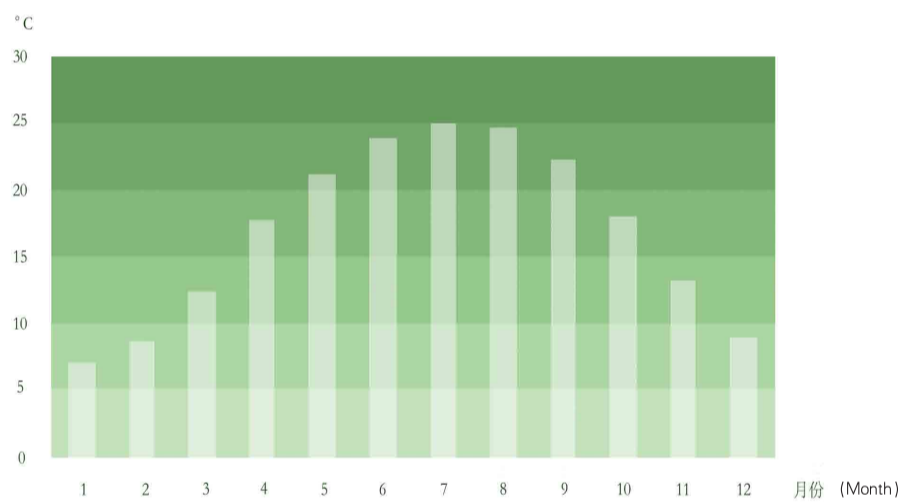
茂兰，在我国植被分区上处于亚热带常绿阔叶林带。但其自然植被除少量藤刺灌丛和灌草丛外，多为发育在喀斯特地貌上的常绿落叶阔叶混交林，这种非地带性的植被覆盖成为了茂兰保护区独有的植被特色。茂兰植物区系既有温带性质的科属，又有热带性质的科属。自然植被包括常绿落叶阔叶混交林、针叶阔叶混交林、竹林、灌木林、藤刺灌丛等多种类型，共计153科601属1803种。

原生性喀斯特森林，由于地貌类型和地形坡位的组合格局，在无明显垂直带分布的情况下，山顶、山脊两侧分布着华南五针松(*Pinus kwangtungensis*)、短叶黄杉(*Pseudotsuga sinensis*)、翠柏(*Calocedrus maceolepis*)、黄枝油杉(*Keteleeria fortunei*)等为优势的针叶阔叶混交林。局部地形平缓且具有土壤堆积条件的地段，如鞍部、丫口，生长着以丝栗栲(*Castanopsis fargesii*)、杜英等为主的较小面积的常绿阔叶树为优势的片段。绝大部份地段包括不同坡位、洼地、漏斗底部等发育的是常绿落叶阔叶混交林。

茂兰植被中，因为长期樵采退化形成的灌木林、受经常性火烧和长期放牧形成的藤刺灌丛和灌草丛，是喀斯特森林顶级群落逆向演替中不同阶段的表现，其分布基本是以村寨为圆心约1—2公里半径的范围内，多在坡下部和洼地中。因受人为干扰的影响，特别是灌草丛，即使停止人为干扰，也很难再重新恢复正向演替。



Average monthly temperature of Maolan Biosphere Reserve (2005)
茂兰生物圈保护区 (2005) 月平均气温



Average monthly temperature of Maolan Biosphere Reserve (1996-2005)
茂兰生物圈保护区 (1996-2005) 月平均气温

茂兰保护区年平均气温为15.3℃，气温均差18.3℃，1月平均气温为5.2℃，7月平均气温为23.5℃，≥10℃活动积温4598.6℃，生长期237天；全年降水量1752.5mm，集中分布在4-10月，年平均相对湿度83%，年日照时数1272.8小时，日照百分率29%，太阳辐射年总量为63289.80kw。

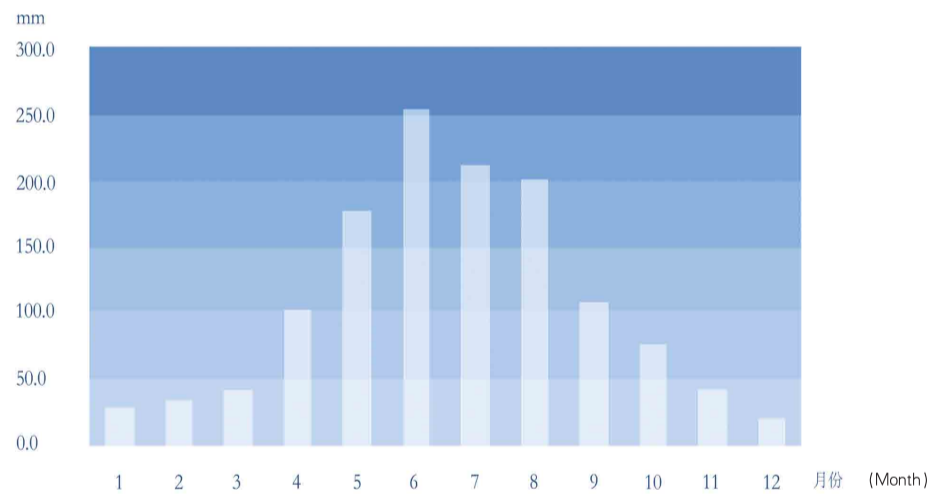
由于茂兰特殊的森林地貌环境，地形逆温是喀斯特森林小地形气温垂直分布的独特之处。夏半年(4-9月)峰丛洼地气温随高度增加而升高，冬半年(10-3月)气温一般随高度增加而降低，峰丛洼地、漏斗底部终年阴湿，各月相对湿度均在90%以上，而山坡的中、上部分，相对湿度较低，晴天时极为干燥。降水量一般随海拔升高而增加。漏斗底部光照极差，年日照时数只相当于顶部的38.5%，晴天时的光照强度，仅为顶部的34.4%。

茂兰保护区处于中亚热带季风湿润气候区，具有春秋温暖、冬无严寒、夏无酷暑、雨量充沛的中亚热带山地湿润气候特色，这一气候特征也是茂兰喀斯特森林得以保存和繁衍发展的一个重要原因。

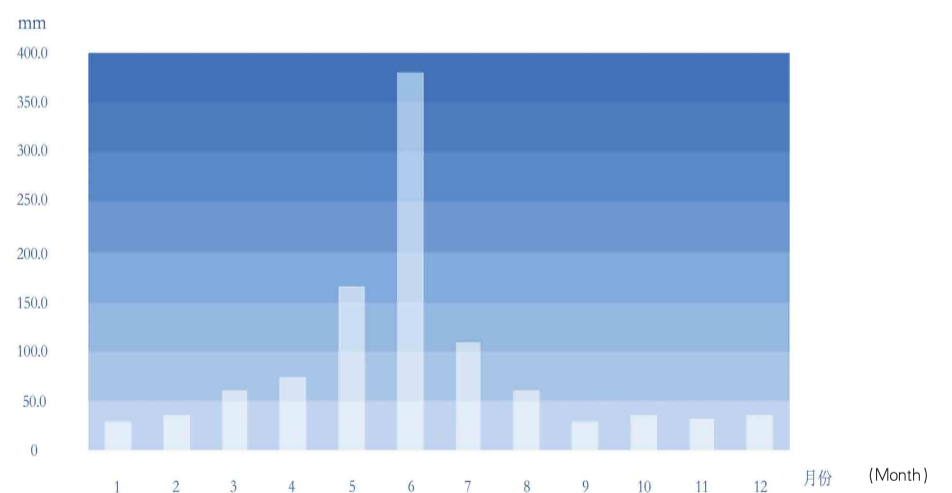
The average mean temperature of the reserve is 15.3℃, with the temperature difference between highs and lows 18.3℃. Average temperature in January is 5.2℃ while in July it's 23.5℃, the active accumulated temperature ≥10℃ is 4598.6℃. Annual precipitation is 1,752.5 millimeters and occurs mainly between the months April to October. Average annual relative humidity is 83%, and annual sunshine is 1,272.8 hours being a daily rate of 29%. The overall solar radiation is 63,289.8 KW.

Because of the special forest land formation of the reserve, the temperature in the depression increases with the altitude in the summer months (April to September), and decreases with the altitude in the winter months (October to March). It's damp all the year at the bottom of the funnels and depression, and the relative humidity is around 90%. While in middle and upper parts of the mountain, the relative humidity is low and is even very dry on sunny days. Precipitation increases with altitude. Sunshine at the end of funnels is bad, the annual sunshine amount is only 38.5% of that at the top, and the sunshine intensity is only 34.4% of that at the top.

Lying in the moist monsoon area of the central subtropical area, the rainfall is sufficient in Maolan Reserve. It has a warm spring and autumn, with the summer and winters being neither too hot nor cold respectively, which is another reason for the quality of preservation found in the Karst forest here.



Average monthly rainfall of Maolan Biosphere Reserve (2005)
茂兰生物圈保护区 (2005) 月平均降水量

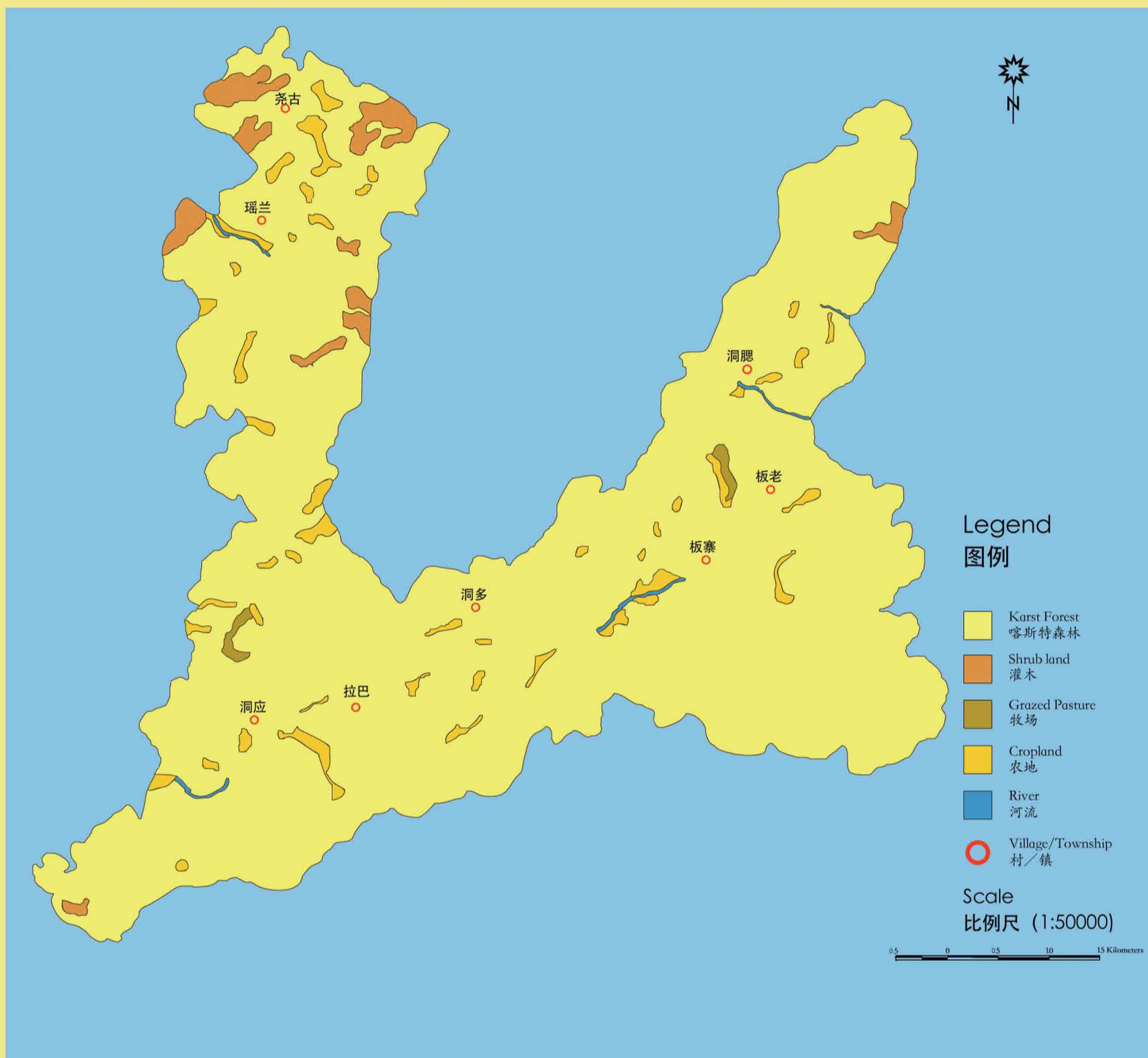


Average monthly rainfall of Maolan Biosphere Reserve (1996-2005)
茂兰生物圈保护区 (1996-2005) 月平均降水量



The Land-Use Map of Maolan Biosphere Reserve

茂兰生物圈保护区土地利用图

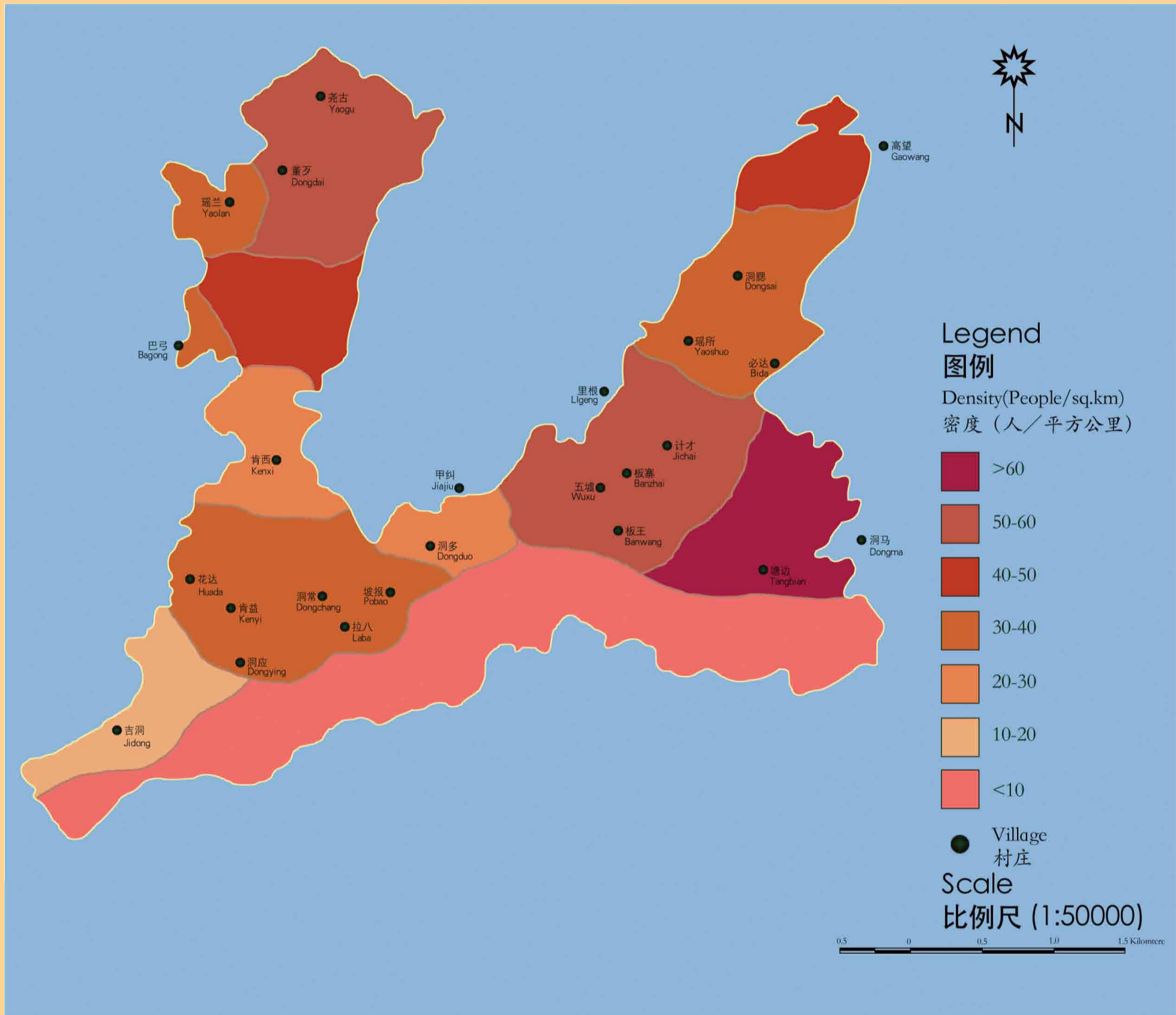


There is not much usable land in the Karst area, therefore fields in the reserve are thin. The total rice paddies in the area cover are 3.91 km², and dry land covers 1.08 km², with the average usable land being 0.00062 km² per person. Maolan is a remote place inhabited by ethnic minorities, with inconvenient transportation and agriculture is the basic source of income. Produce includes rice, corn, bean and rape, traditional side-line industries are plum harvesting, mat weaving, and herb collection. There is no processing industry nor any other industry in the region, so the local economy is very under-developed. The annual crop output is 22, 268, 836 kg, with an average of 684.3 kg per person. Average annual income is 840.2 Yuan. The majority of the locals' count on wood as source of fuel and substantial consumption has caused damage to the forest to some extent each and every year.

Most of the villages are connected to roads except Biba, Pobao and a few others. There are altogether 10 county-level roads coming into the area with narrow surfaces and would be unusable on rainy days. The main road from Libo to Guangxi, and the railroad from Guangxi to Libo coal mines are all close to the Maolan Reserve. Locals are highly dependent on the forest and consume a certain amount of the forest resources.

喀斯特地区可利用土地资源少，因而茂兰保护区内耕地稀少。全区共有水稻田3.91 km²，旱地1.08 km²，人均占有耕地0.00062 km²/人。茂兰地处贵州南部少数民族边远地区，交通闭塞，文化落后，仍以传统农业生产为主，生产粗放，经济极不发达。农作物以水稻、玉米、黄豆、油菜为主。传统副业为酸梅种植、凉席编制、中草药材采集等，没有加工业和乡镇企业。全年粮食产量22267836kg，人均684.3kg，人均年收入840.2元。区内群众所需的绝大部份能源仍以薪柴为主，每年均要消耗大量的森林资源，对茂兰喀斯特森林资源造成了一定程度的破坏。

除比巴、坡报等几个村寨。保护区内绝大部分自然村寨均已通公路。区外共有10余条乡村级公路可以进入区内，公路状况差、路面窄，逢雨天难以通行。荔波至广西的主干线公路和广西至荔波煤矿区的地方铁路都紧挨保护区边缘。由于交通闭塞，经济发展相对落后，区内居民对喀斯特森林的依赖性较大，因而在生产生活上均需消耗一定的森林资源。



In the reserve, there are 18 villages in 7 counties and townships of Lihua, Yongkang, Dongtang, Wengang, Yaoshan, Jiaou, and Jialiang, with approximately a population of 8,000 in 75 village groups. The population density is 37.6 per km², and the number of Maolan, Buyi, Shui, Yao, and Zhuang ethnic minorities is 7,400 which accounts for 93% of the total. Among them, Buyi and Shui are the majority, the Yao people are mainly located in Yaozhai and Dongchang, and the Zhuang are scattered amongst the villages.

Being a mountainous province with forest coverage of 40%, Minority nationalities here worship mother nature, and therefore lots of conservation methods have been maintained within their traditions.

The animistic Yao people were the first people to settle in Maolan. They worshiped the spirits of mountains, water, trees, and earth. One tradition of them is to build a hut under the sacred tree of each village, where they would gather and pray for a good future during festivals.

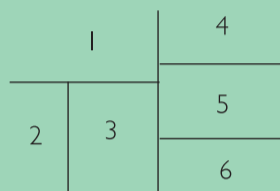
Shui and Buyi believe that a forest is like a mother's milk. As such, they endeavor to protect the forest and use the resources as reasonably as possible. That is why the Karst forest has survived as intact as it has done, even though these minority nationalities have been living there generation after generation.

茂兰保护区内涉及荔波县的立化、永康、洞塘、翁昂、瑶山、驾欧、甲良七个乡镇，18个村，75个村民组，共有人口8000人，人口密度37.6人/km²。多民族聚居的茂兰，布依、水、瑶、壮等少数民族人口达7400人，占总人口的93%。其中以布依族和水族人口为多，瑶族居住在瑶寨、洞常等地，壮族零星散居于一些村寨。

茂兰保护区所在的贵州省是一个“八山一水一分田”的多山省份，全省的森林覆盖率达40%，即便是在岩溶地貌上还保留着茂密的森林，这与聚居在这里的少数民族所形成的习俗有着密切的联系。源于对自然的原始崇拜，神灵观念所形成的禁忌逐渐演变成了“习惯法”，体现在约定俗成的“乡规民约”。

瑶族是开拓茂兰的最早民族。瑶族信仰自然宗教，相信万物有灵，崇拜雷神、寨神、山神、树神、水神、土地神等。树神由瑶族头人确定，在该神树下搭建小瓦棚，以便人们敬树神时烧香供奉祭拜。神树被瑶族人称之为“戏王”，相传可戏弄鬼怪，避邪驱恶。每逢过年过节，瑶族人都要去拜祀，以求族人平安顺利。

水族、布依族人认为森林犹如母亲的乳汁，是本民族得以生存的唯一依托，他们竭力保护森林，有节制地利用森林和其它动植物资源。因而，茂兰的土著民族虽然世代生活于此，但未对喀斯特森林形成大的破坏。



(1) Snails: There are 87 types of land snail in Maolan, belonging to 36 genera from 14 families in 2 orders. Analysis shows that once encroachment of farming and building happened within the forest, the diversity and number of snails will be notably reduced until they completely vanish.

(2) Crest serpent eagles (*Spilornis cheela*): mainly distributed in India, southern China, Southeastern Asia, Palawan and the Sunda Islands. They are normally seen in forest-covered mountains of altitudes 1,900m high, and appear in pairs perched on branches in the shade. This eagle is advantaged raptor in big numbers within the reserve.

(3) The tiny flowered lady slipper (*Paphiopedilum hirtiorrhiza*): *Paphiopedilum* is an endangered species of *Arethusa*, and is very highly valued in gardening. Many kinds of them are already extinct, and are listed in appendix I of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) and are prohibited in trade.

The widespread tiny flowered *Paphiopedilum* is originally from Yunnan, Guangxi and Guizhou, and is often seen on Karst slopes and ridges in the north at altitudes between 400 meters up to 1,450 meters. We can usually find them among mosses and leaves on shaded rocks or in cracks along the rock. Because of wood collected for fuel purposes, a lot has been exposed to the sun and became albino, even more are on the verge of withering away. It has disappeared in some of the areas with excessive harvest for wood. There is still a fair amount of this flower in Maolan.

(4) Karst funnel forest: Karst Funnel forest is the extensive forest distributed on the Karst Funnel. It's about 150 to 300m from the end of the funnel to the peak, integrated with three steep peaks, various kinds of well developed land forms as the sinkhole funnel, depressions, blind valleys and corrosive holes, all kinds of trees grow in the crack, rattan in odd shapes clamber along the cliffs. Few men had ever set foot on it, the green world here is just like a kingdom shrouded in quite and peace.

(5) Bodinier handeliiodendron (*Handeliiodendron bodinieri*): This is a deciduous tree of Sapindaceae of *Handeliiodendron* Rehd, only seen in very small numbers in Libo, Dushan, Anlong, Xingyi, Pingtang and Pingzhou of Guizhou, and Longlin, Leye, Donglan, Lingyun, Nandan, Lingle, Tianlin and Tianer of Guangxi. It's autogenous plant remaining in China, and a precious tree of the mixed sub-tropical limestone evergreen and broad-leaved forest. It's listed on the highest level of Chinese national environmental protection. The tree is about 13 to 15m high, with white and yellowish bark, falling off in thin pieces. Branches are yellow-brown with irregular lentils on them. Because of the seed collection for oil manufacture, renewal and conservation of it in the Karst forest is difficult. It is under immediate danger of extinction if no effective protection is exercised.

(6) Libo blind loach (*Cobitidae*): This is a typical speleean fish. It is half transparent with no eyes, only known with distributions in Karst caves inside the Maolan Reserve, and is presently found only in limited numbers. The fish is not only beautiful in image, but also an indicator species of ground water seeking and quality monitoring according to its lifecycle depended on the water.

(1) 蜗牛(Snail)

茂兰陆生贝类有87种，隶属于2目14科36属。多样性研究分析结果表明：原生森林一旦被垦为农田或为建筑物所占据，其内原有的陆生贝类物种数量将显著减少，甚至完全消失。

(2) 蛇雕 (*Spilornis cheela*)

蛇雕主要分布于印度、中国南部、东南亚、巴拉望岛及大巽他群岛。在高达海拔1900米有林覆盖的山丘为最常见的雕类，常于森林或人工林上空盘旋，成对互相召唤。求偶期成对作懒散的体操表演，常栖于森林中有阴的大树枝上。蛇雕是茂兰保护区内分布数量较多的猛禽类优势物种。

(3) 硬叶兜兰(*Paphiopedilum hirtiorrhiza*)

兜兰属(*Paphiopedilum*)是兰科植物的一个濒危类群，该属中许多种类具有很高的观赏价值，资源破坏十分严重，一些种类已濒临灭绝。在CITES中被列入附录I，绝对禁止贸易。

我国特有的硬叶兜兰原产于云南、广西、贵州等地，分布于海拔(400)900—1450米北向的喀斯特山脊或山坡上。我们常常可以在极阴暗的岩石表面、岩石裂缝薄土上，或覆有一些中性土、苔类、落叶的岩石斜面上看到她娇美的身影。但是，目前对薪的柴砍伐破坏了其生长环境，使其暴露于阳光下，造成死亡及白化，伴随大量的采集，这种兰花正在从一些分布地渐渐消失。

茂兰喀斯特森林区内目前还保存着一定数量的硬叶兜兰种群。

(4) 喀斯特漏斗森林(Karst funnel forest)

漏斗森林为森林密集覆盖的喀斯特峰丛漏斗，状若深邃的巨大绿色窝穴。漏斗底至锥峰顶一般高差150—300米，人迹罕至，万物原始自然。各种各样的树木根系深扎于喀斯特裂隙之中，奇形怪状的藤萝攀附林冠共处于峭壁之上，枝叶繁茂，浓荫蔽日，漏斗森林的景色神秘而静恬。

(5) 掌叶木(*Handeliiodendron bodinieri*)

掌叶木是落叶乔木，属无患子科(Sapindaceae)掌叶木属(*Handeliiodendron* Rehd)。数量稀少，分布于贵州省的荔波、独山、安龙、兴义、平塘、平舟和广西壮族自治区的隆林、乐业、东兰、凌云、南丹、凌乐、田林、天峨。是残遗于我国的单属植物，为亚热带石灰岩山常绿、落叶阔叶混交林的珍贵树种，国家一级保护植物。成树高达13—15米；树皮黄白色，呈薄片状脱落；小枝黄褐色，有散生皮孔。由于常年采种榨油，破坏严重，加上喀斯特地区的特殊性，更新困难，若不加以保护，将有灭绝的危险。

(6) 荔波盲条鳅(Libo blind loach)

荔波盲条鳅属典型的真洞穴鱼类，无眼，透明或半透明。目前仅知分布于茂兰保护区内的喀斯特洞穴中，数量稀少，它不仅形象优美，而且根据其生命周期活动对水的依赖关系，还是寻找地下水源、监测水质变化的指标生物之一。

Shankou Mangrove Biosphere Reserve is located at East Longitude 109° 8' 2" - 109° 7' 0" and North Latitude 21° 8' 2" - 21° 7' 0", and is one of the first five Marine Nature Reserves approved by the State Council in 1990. It became part of the China Man & Biosphere network in July 1993, and a member of the UNESCO MAB in Jan. 2000. The Shankou Reserve is also enlisted as an International Important Wetland. The reserve has a total area of 80 km², among which, 40 km² is marine and 40 km² is terrestrial, it also has two management stations, Yingluo and Yongan.

The Shankou Reserve includes, the east and west shores (and water) of Shatian Peninsula in southeast Hepu County of Guangxi province. It borders the Zhanjiang Mangrove Nature Reserve in Guangdong Province and contains three town, Shankou, Shatian, and Baisha of Hepu County. It is 105 km east of Beihai in Guangxi and 93 km away from Zhanjiang in Guangdong. The administration bureau is located in Hepu County, which is 77 km from the mangroves.

Shankou Mangrove Biosphere Reserve Management Bureau

Address: No. 30 Aiwei Dong Jie, Lianzhou Town, Hepu County, Guangxi

Postcode: 536100

Tel: +86 779 7196 608, 5212 345 (Tourism zone)

Fax: +86 779 7192 976

Email: skhsl@tom.com

山口红树林生物圈保护区位于东经109° 8' 2" - 109° 7' 0"，北纬21° 8' 2" - 21° 7' 0"，1990年经国务院批准成为我国首批5个海洋类型自然保护区之一。1993年7月加入中国人与生物圈网络。2000年1月被联合国教科文组织人与生物圈(MAB)保护区网络接纳为成员。2001年3月被列入国际重要湿地名单。山口保护区海岸线总长50km，管辖范围总面积80平方公里，其中海域面积为40平方公里，陆地面积40平方公里。保护区内设有英罗和永安两个保护站。

山口保护区由广西合浦县东南部沙田半岛的东西两侧海岸及周边海域组成。东与广东省湛江红树林保护区接壤，地域跨越合浦县的山口、沙田和白沙三镇。保护区西距广西北海市105km，东南距广东省湛江市93km。保护区管理处设在西汉故郡、南珠故乡的广西合浦县城，距红树林保护地77km。

山口红树林生物圈保护区管理处

地址：广西合浦县廉州镇爱卫东街30号

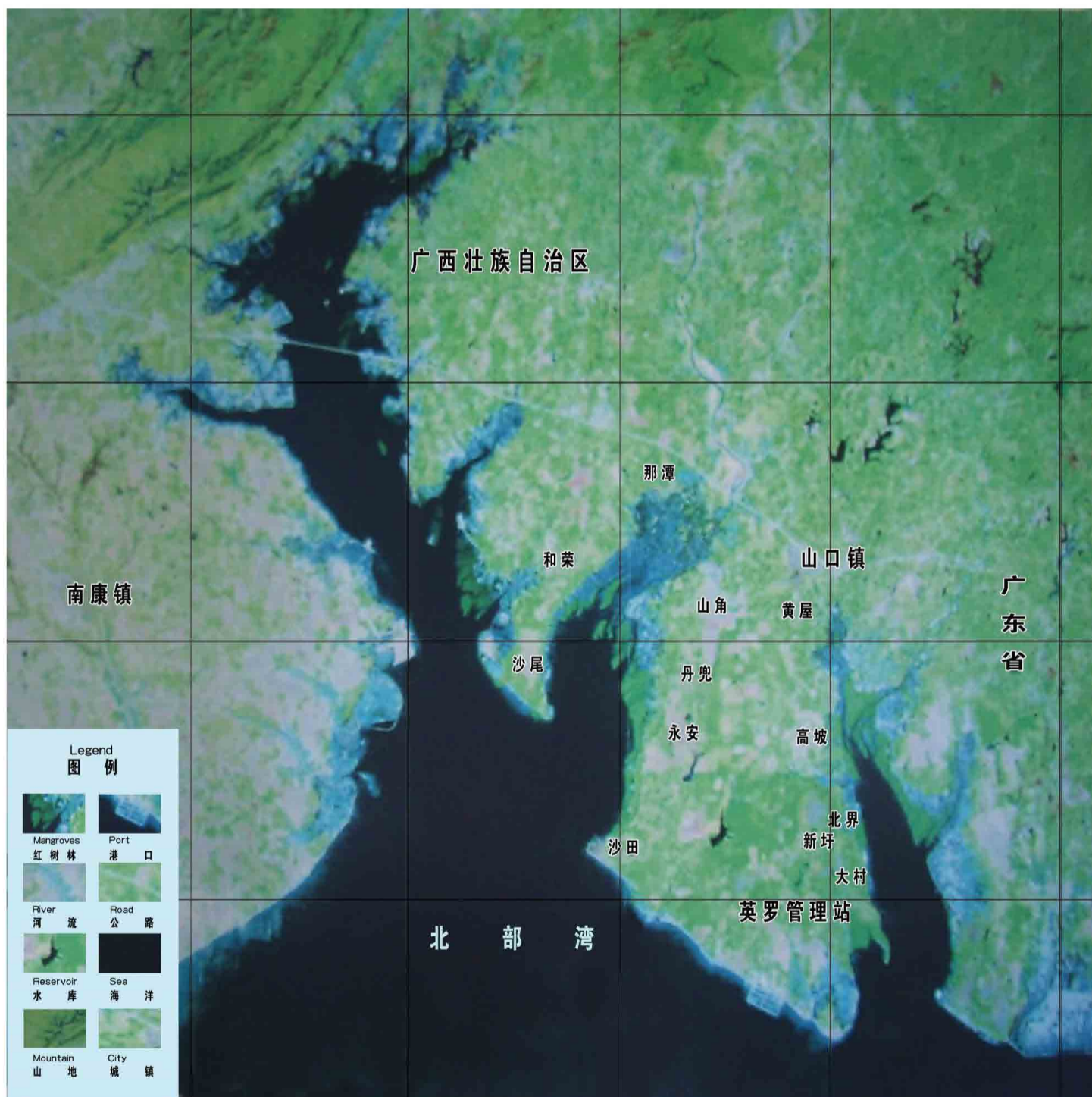
邮编：536100

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传真：+86 779 7192 976

电邮：skhsl@tom.com

广西山口国家级红树林生态自然保护区卫星遥感影像图





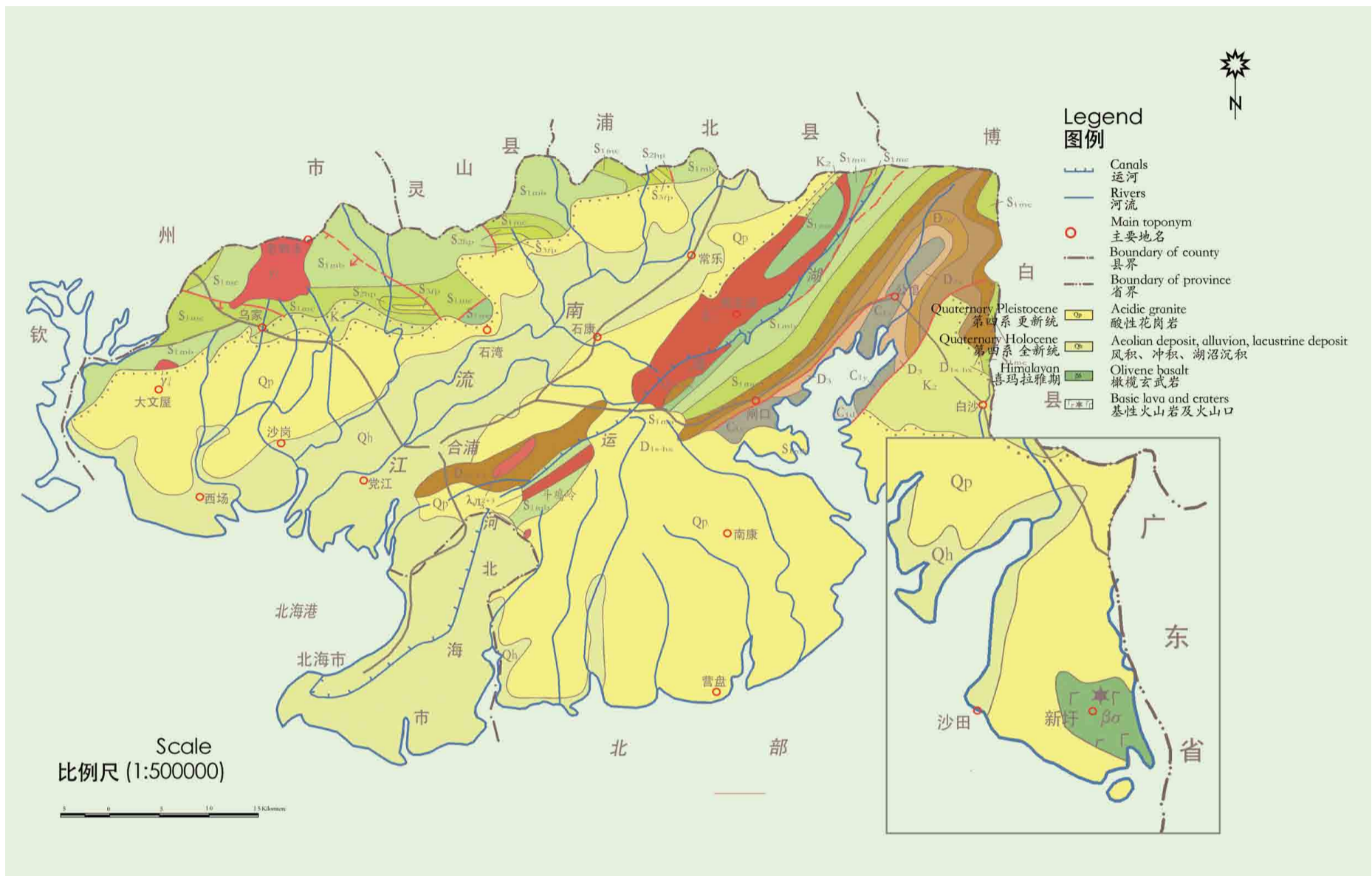
Based on the distribution of mangroves and the coastal lines, the Shankou Reserve is divided into an 8.25 km² core zone, a 35.76 km² buffer zone, and a 35.76 km² transition area. The core zone is inside the Yingluo Port, it is rich in biodiversity particularly the very tall endangered *Rhizophora stylosa* and *Bruguiera gymnorrhiza*, development is strictly forbidden here. Short *Aegiceras corniculatum* and *Avicennia marina* are widely seen in the buffer zone in the Dandou Sea, and forest restoration and fish breeding are also carried out. Land that is 1 km above the high-tide line, and the surrounding shores outside the mangrove belong to the transition area, this is where fishing and farming are allowed. The main work in the reserve in terms of management is to prevent human activities and natural causes from negatively impacting the mangrove and marine environment.

按照管辖区域的海岸环境特征和红树林资源分布状况，山口保护区被划分为8.25平方公里的核心区、35.76平方公里的缓冲区以及35.76平方公里的过渡区。核心区主要分布在英罗港海域内，保护的是珍贵的红海榄和濒危的木榄及其种源地，这里树群高大，林冠整齐，景观优美，生物多样性丰富，区内实行封闭管理，严禁毁林开发。位于丹兜海内的缓冲区内分布着连片面积最大，植株矮小的桐花树和白骨壤。作为探索红树林资源可持续发展利用的方法和模式，区内开展了恢复造林、次生林改造及生态养殖试验。过渡区为海岸高潮线以上1km以内的陆域和林区外围的海域滩涂，是当地村民渔业生产和耕作区。在管理上主要是限制和防止人为活动和自然因素对红树林及海洋环境的不良影响。



The terrestrial topography of the reserve is mainly Ancient Alluvial and Deluvial tableland. In addition, a narrow Marine Sedimentation Plain is located between the coastal line and the stream mouth, while marine cliffs can be found in parts of Yingluo Port. The tract plain has slow-rising slopes, and freshwater is present in low areas. The soil is loose on the verge of the tract and often collapses under gravity and water, hence soil erosion in the summer wet season is severe. The east and west sides of the Shatian Peninsula are typical Lianman, which is a flat open area of deep mud. The underwater sand bar outside the Rhizophora stylosa in Yingluo Port emerges with the tide and functions like a lagoon, it is the reason why mangroves flourish in the area. Three rivers, the Wuliu, Ximi, and Daba flow into Yingluo Port from the east, while the Nanjiao River flows into Dandou Sea from the west. The Guilin-Beihai Expressway leads to Shankou Town directly, and a 19 km long (village) road connects the town and the Yingluo tourism zone of the reserve.

山口保护区内的陆岸地貌类型以古冲积—洪积台地为主，在台地边缘（古海岸线）和现代海岸线之间和小河口区形成了狭长的海积平原，英罗港的部分海岸出现海蚀崖；滨海的台地平原，坡度平缓，低洼处淡水充足，松散土层在台地边缘由于自重力及地下水与地表水的综合作用而崩塌并形成了崩沟，夏季暴雨来临时水土流失相当严重；沙田半岛的东西两侧是典型的溺谷海湾岸类型，潮间带淤泥深厚，开阔平坦；英罗港红海榄林外的水下沙坝随着涨潮落潮而时隐时现，这种地貌具有泻湖的功能，是这里红树林茂盛的重要原因。武留江、洗米河和湛江的大坝河3条小河汇入保护区东面的英罗港，西面的丹兜海仅有那郊河注入。桂林-北海高速可直达山口镇，山口镇至保护区英罗旅游区由19公里的乡村公路相连。



地质年代表 (部分)
Geochronologic Chart (part)

代	纪	世	距今约 (百万年) Age	主要生物演化 Evolution of Major Life-Forms	构造阶段 Orogeny Phase			
新生代 Cenozoic	第四纪 Quaternary	全新世 Holocene	0.01	现代 Present 现代植物 Age of Man Modern Plants	喜马拉雅期 Himalayan Phase			
		更新世 Pleistocene	2.4	现代植物 Age of Man Modern Plants				
	第三纪 Tertiary	上新世 Pliocene	5.3	哺乳动物 Mammals				
		中新世 Miocene	23	哺乳动物 Mammals				
		渐新世 Oligocene	36.5	被子植物 Angiosperms				
		中新世 Eocene	53	被子植物 Angiosperms				
		古新世 Paleocene	65	被子植物 Angiosperms				
		中生代 Mesozoic	白垩纪 Cretaceous	中 Middle		1.35	爬行动物 Reptiles	燕山期 Yanshanian Phase
				早 Early		20.5	爬行动物 Reptiles	
			侏罗纪 Jurassic	中 Middle		2.50	爬行动物 Reptiles	印支期 Indosinian Phase
早 Early	2.50			爬行动物 Reptiles				
三叠纪 Triassic	中 Middle		2.90	爬行动物 Reptiles	(海西) 华力西期 Variscan Phase			
	早 Early		3.55	爬行动物 Reptiles				
古生代 Palaeozoic	二叠纪 Permian	中 Middle	4.10	两栖动物 Amphibians	加里东期 Caledonian Phase			
		早 Early	4.38	两栖动物 Amphibians				
	石炭纪 Carboniferous	中 Middle	4.38	两栖动物 Amphibians				
		早 Early	5.10	两栖动物 Amphibians				
	泥盆纪 Devonian	中 Middle	5.10	两栖动物 Amphibians				
		早 Early	5.70	两栖动物 Amphibians				
	志留纪 Silurian	中 Middle	5.70	鱼类 Fishes				
		早 Early	5.70	鱼类 Fishes				
奥陶纪 Ordovician	中 Middle	5.70	藻类 Algae					
	早 Early	5.70	藻类 Algae					
寒武纪 Cambrian	中 Middle	5.70	无脊椎动物 Invertebrates					
	早 Early	5.70	无脊椎动物 Invertebrates					

1. The divisions of stratum layers correspond to the geologic time system: Eon, Era, Period, Epoch

2. The stratum layers of lower, middle and upper correspond to geologic time early, middle and late in the chart.

下、中、上的地层单位对应早、中、晚的地质时间

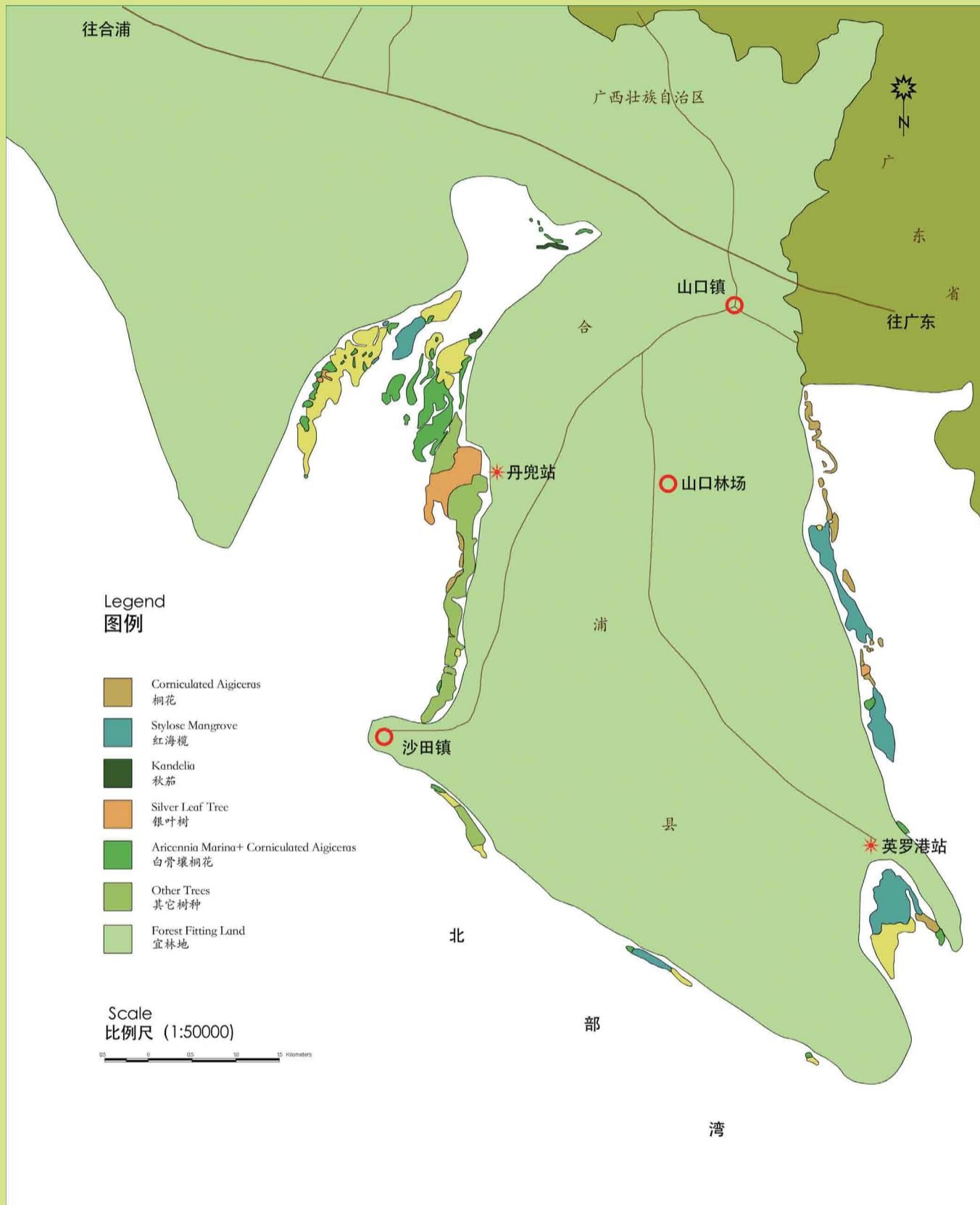
The main geologic type of the reserve is Quaternary loose sediment, olivine basalt and basic lava, among which the Quaternary loose sediment accounts for 80% of the terrestrial land of the reserve and can be divided into Holocene and Pleistocene. The Holocene is as thick as 10.5 meters and is distributed in the area 1 to 2 km above the high-tide line of the Dandou Sea, it consists mainly of sandy gravel stratum and silt clay interbedded with peaty soil. While the Pleistocene is 8.1 to 60 meters thick and consists of colorful sandy gravel, silt, silt clay, sandy soil stratum and organic clay (from bottom to top), and is seen from Ximi to Xincun of Yingluo. Pyroxene and volcanic rocks are mainly 4 to 6 km above sea level and found from Xincun of Yingluo to Maanling, where a 9.9 km² area of heavy and phosphorous rich latosol has been formed. Marine latosol and basaltic latosol formed from ancient neritic sediment and a small amount of basaltic slope wash can be seen, while salt soil in the bare area in the tidal zone and marsh seashore saline soil are seen below the low and mid-level tide line.

With the inflow of freshwater, the still natural bay is very suitable for the growth of mangroves. The biota sediment that accounts for 70% of the shore area is what the mangrove needs, and the geological substance of the area has no direct impact to mangrove.

山口红树林生物圈保护区地质图:

山口保护区的主要地质类型为第四纪松散沉积物、橄榄玄武岩和基性火山岩。第四纪松散沉积物约占保护区陆域面积的80%以上,分为全新统和更新统两类。全新统集中分布在丹兜海两侧海岸高潮线以上1~2km的陆域地带,厚度约为1.5~10.5m,主要成分是砂砾层及粉砂粘土质泥炭土;更新统主要分布在英罗港洗米河口至新村岸段,厚度约8.1~60.0m,由底层向上,依次分布着五颜六色的砂砾、粉砂、砂质粘土、砂土层和有机质粘土。橄榄玄武岩和基性火山岩主要分布在英罗港新村至马鞍岭一带海岸线以上4~6km的区域内,并发育成面积约9.9平方公里的质地粘重、含磷丰富、肥力较高的砖红壤。古浅海沉积物及少量玄武岩堆积物发育成海积砖红壤和玄武岩砖红壤。中低潮线以下主要为潮间光滩盐土和少量的沼泽滨海盐土。

地质变化形成的天然港湾,风平浪静,加之河流入海口的淡水调节,非常适宜红树植物生长。红树植物生长主要依赖约占滩涂面积70%以上的粉泥状生物沉积物,本地区的地质成分与红树植物的生长并无直接关系。



Only the woody plant growing in tidal zone is called a mangrove. The reserve has 10 genera in 9 families of 7 orders of mangroves. The categories account for 90.9%, 90%, and 87.5% of all mangroves in Guangxi, 37%, 60%, and 58.3% of mangroves in China, as well as 14.3%, 33.3%, and 35% of mangroves in the world. With its sub-tropical vegetation, the reserve has the most variety of mangroves among the 6 national-level nature reserves in China. Mangrove communities in the reserve are mainly of 6 kinds: *Avicennia marina*, *Aegiceras corniculatum*, *Kandelia candel*, *Rhizophora stylosa*, *Bruguiera gymnorrhiza*, and *Excoecaria agallocha*. Of these, *Rhizophora stylosa*, *Bruguiera gymnorrhiza* and *Kandelia candel* are dominant. Mangroves are tenacious and have adapted to environments that are salty, have limited-oxygen and excessive sunlight. The leaves of mangroves are tannic-rich, they reproduce in the viviparity way, and the various forms of roots either stand firmly in the mud or breathe on the ground surface because of natural adaptations. Vegetation distribution is dependant on tidal zones elevation, and from the outer to inner shores there are *Avicennia marina*, *Aegiceras corniculatum*, *Kandelia candel*, *Rhizophora stylosa* and *Bruguiera gymnorrhiza*. (See Chart I attached)

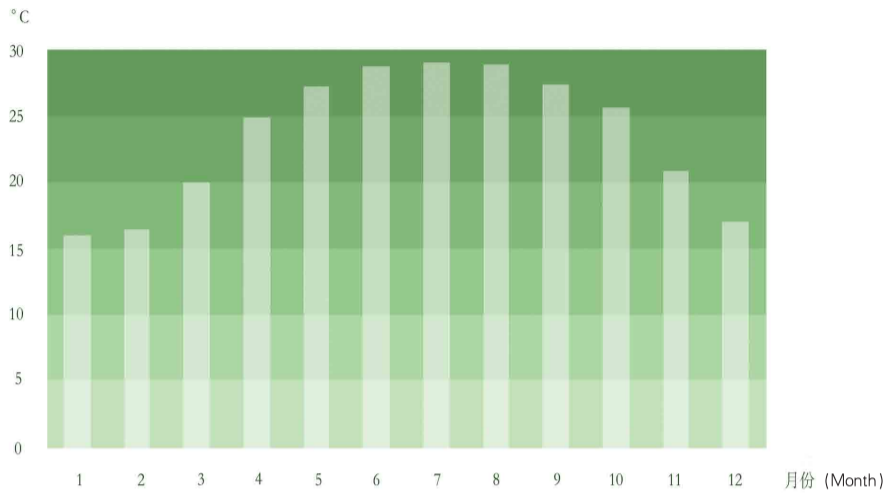
只有生长在潮间带上的木本植物才被称为红树植物。山口保护区的红树植物种类有7科9属10种，分布比例分别占广西的87.5%、90.0%和90.9%，占全国的58.3%、60.0%和37.0%，占全球的35.0%、33.3%和14.3%，在全国6个国家级红树林保护区中红树植物种类最多，红树植物群系呈显著的亚热带特征。山口保护区的红树植物群落可划分为白骨壤群落 (*Avicennia marina*)，桐花树群落 (*Aegiceras corniculatum*)，秋茄群落 (*Kandelia candel*)，红海榄群落 (*Rhizophora stylosa*)，木榄群落 (*Bruguiera gymnorrhiza*) 和海漆群落 (*Excoecaria agallocha*) 6种基本类型。优势种群是红海榄、木榄和秋茄。生长在盐渍化、缺氧、潮汐浸淹冲刷和光照强烈的潮间带上，红树植物以更多的冷次焯来适应生态环境，顽强生长，叶片的旱生结构和高渗透压令它们保持体内水分、平衡盐分，富含丹宁的树皮抵御着海水的侵蚀，胎生繁殖保持着物种的延续，特化形成的支柱根、呼吸根、膝状根、气生根、表面根等，或是深扎在淤泥里稳稳地支撑着树冠，或是冒出地面、盘绕交错，帮助呼吸。

山口保护区红树植物种群分布规律由潮滩地势高低而决定，基本上从外滩到内滩依次为白骨壤、桐花树、秋茄、红海榄和木榄，白骨壤主要分布在外滩至中滩的广大区域和中内滩潮沟边；中内滩大量生长着红海榄、木榄和秋茄三种乔木种群；海漆、水黄皮、杨叶肖槿的身影常出现在海堤岸边；积水处或者潮沟边通常密集分布着桐花树；人工速生桉树林只在保护区内防护林带有少量分布。

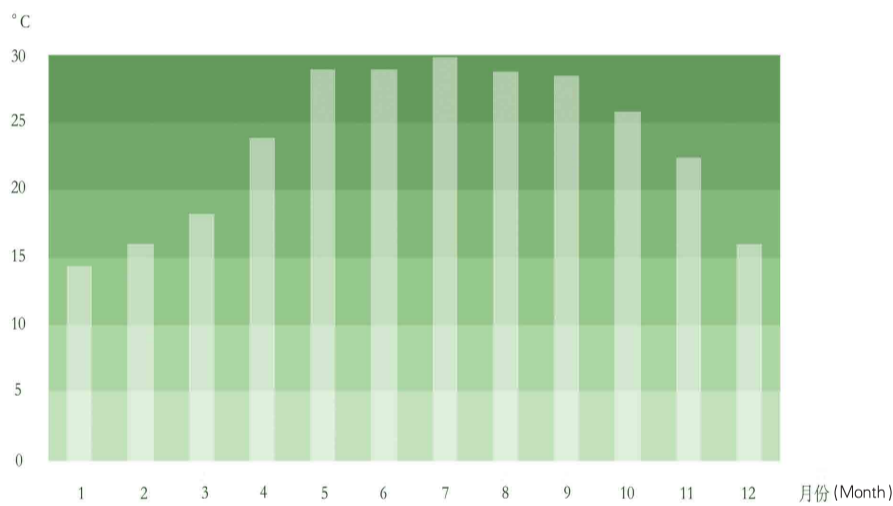


The Climate Charts of Shankou Mangrove Biosphere Reserve

山口红树林生物圈保护区气候图



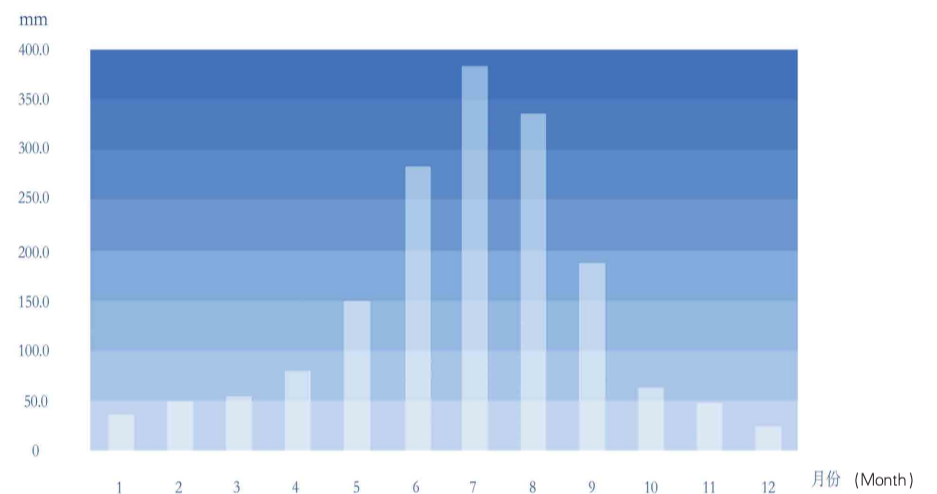
Average monthly temperature of Shankou Mangrove Biosphere Reserve (2005)
山口红树林生物圈保护区 (2005) 月平均气温



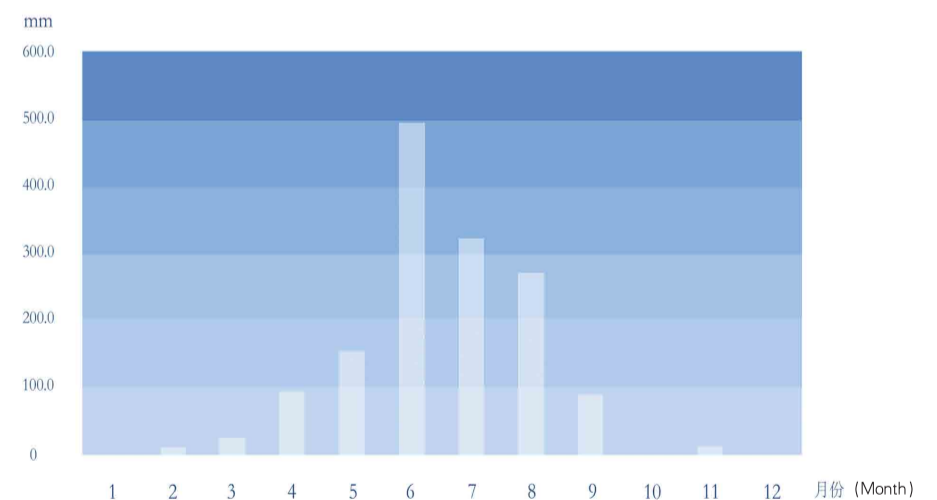
Average monthly temperature of Shankou Mangrove Biosphere Reserve (2000-2005)
山口红树林生物圈保护区 (2000-2005) 月平均气温

山口红树林生物圈保护区位于广西东海岸，属亚热带海洋性季风气候。年平均日照时数1796~1800h，年平均气温23.4℃，≥10℃年积温7708~8261℃，1月平均气温14.2~14.5℃，极端低温2.0℃。气温年变化幅度不大，仅13.8℃。年平均降水量1500~1700mm，约有一半的降水量集中在夏季。年蒸发量为1000mm~1400mm，年平均相对湿度为80%。主要灾害性天气为台风（年均2~3个，多在7~8月发生）和暴雨。气候温和，光热充足，干湿季分明，有效积温高的气候特点十分有利于红树植物的生长发育。一旦成林的红树植物在潮涨潮落之间越发的顽强，它们形成的“绿色海堤”不仅能有效地消减台风等恶劣天气造成的自然灾害还能当地百姓带来海产、养殖等诸多经济效益。但是，近些年来全球气候变暖、海平面上升潜移默化地改变着红树植物生长环境，这一问题也正引起红树植物学家的关注。

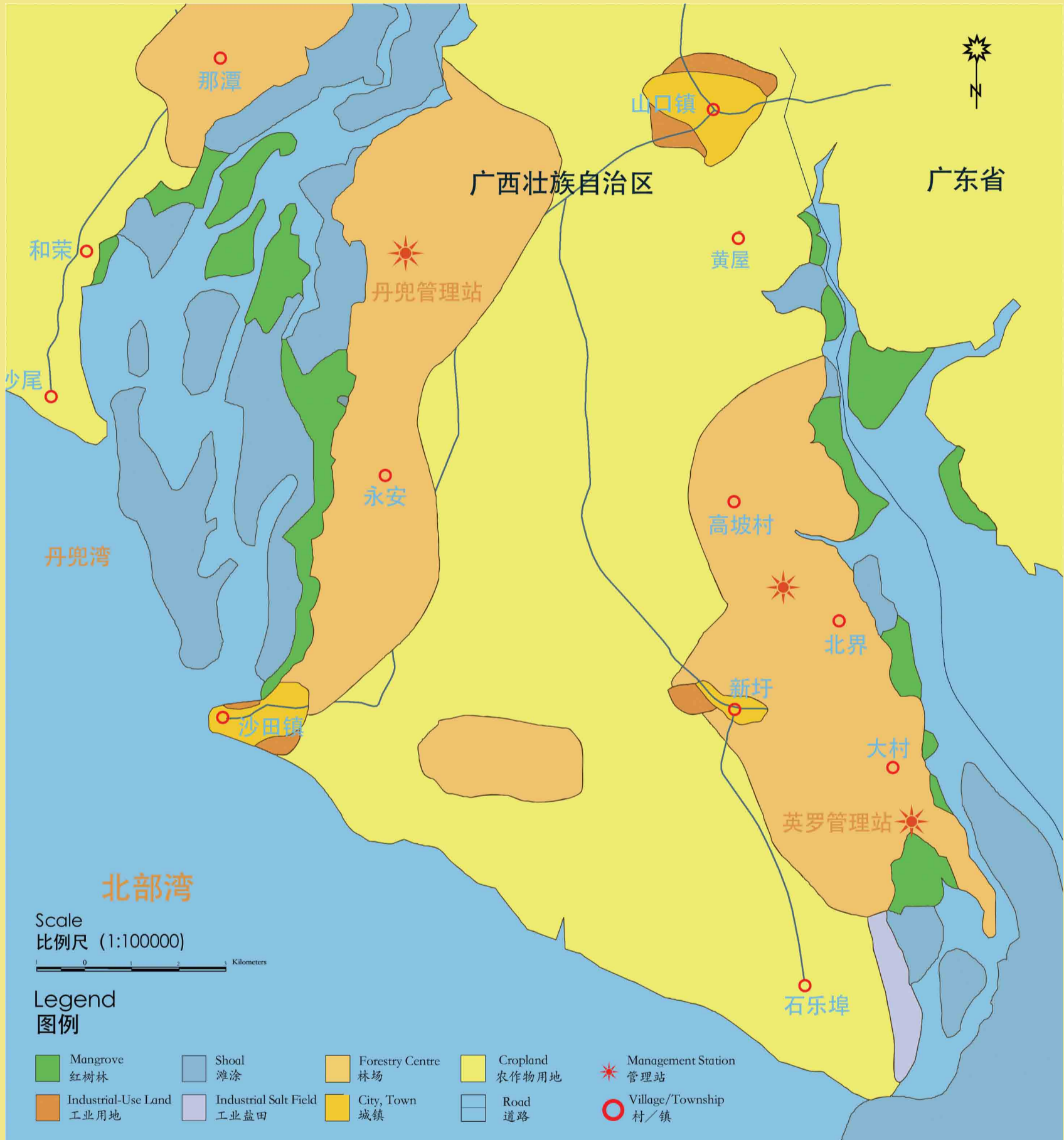
The Shankou Mangrove Biosphere Reserve is located on east coast of Guangxi, and has a sub-tropical marine monsoon climate. Average annual sunlight is 1,796 to 1,800 hours, and average annual temperature is 23.4℃, with accumulated annual temperature at and over 10℃ is 7,708 to 8,261℃. Average temperature in Jan. is 14.2 to 14.5℃, with the lowest at 2℃. The temperature difference within the year is only 13.8℃. Annual precipitation is 1,500 to 1,700 mm, and over half occurs in summer. Annual evaporation is 1,000 to 1,400 mm, and the average annual relative humidity is 80%. The main natural disaster is typhoons (2 to 3 times a year, mainly in July and Aug.) and severe storms. The climate is usually calm and with abundant sunshine, the area has distinct dry and wet seasons. The Green Belt of mangrove is effective to prevent economic losses brought by natural disasters, however, climate change and rising sea levels mean the environmental conditions that the mangrove needs to survive are changing.



Average monthly rainfall of Shankou Mangrove Biosphere Reserve (2005)
山口红树林生物圈保护区 (2005) 月平均降水量



Average monthly rainfall of Shankou Mangrove Biosphere Reserve (1996-2004)
山口红树林生物圈保护区 (1996-2004) 月平均降水量



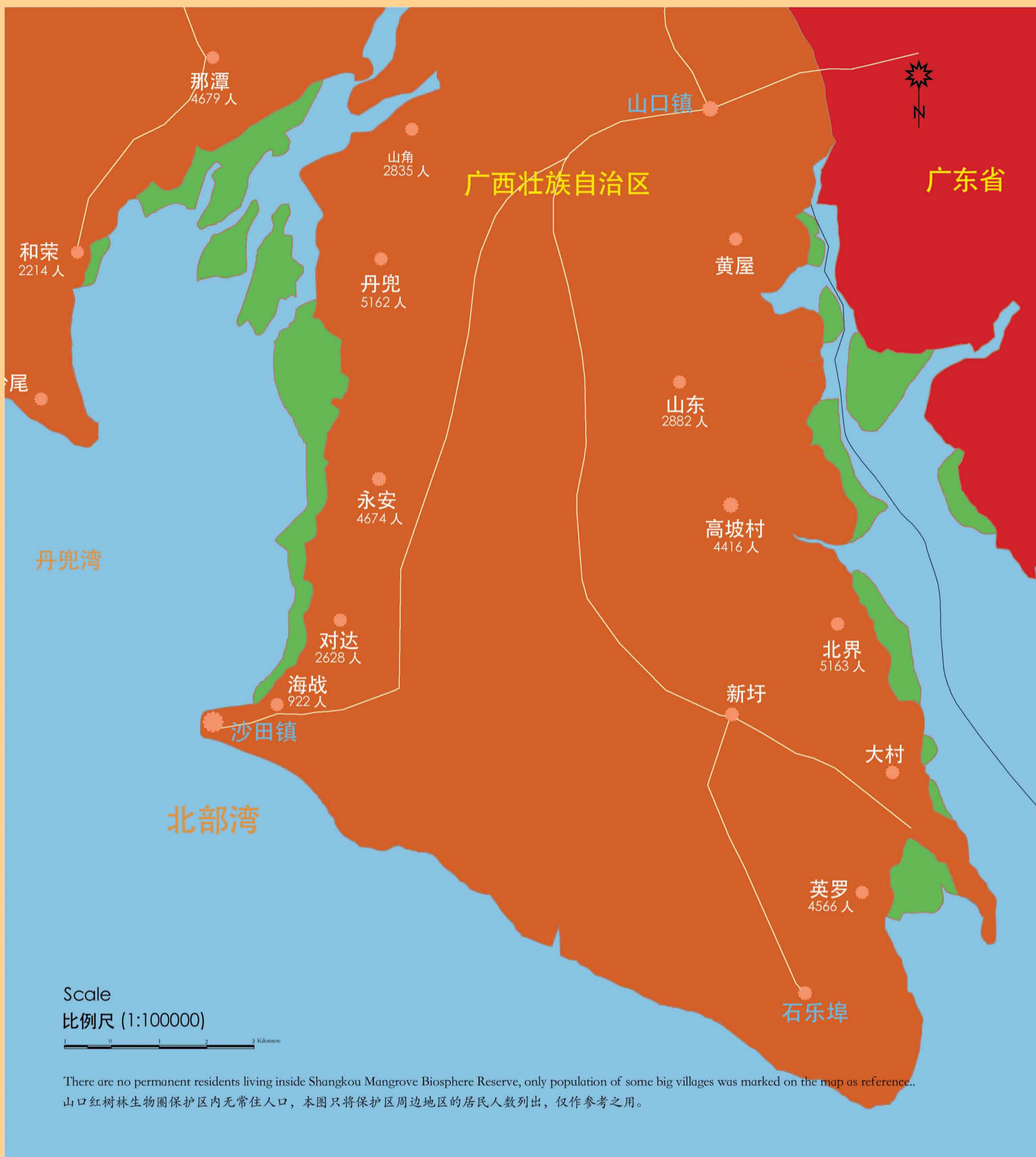
The main land use patterns of the reserve are agriculture and forest. A small amount of dry-land crops are planted on slopes, while forest includes a green belt and economic timber production forests. The green belt is a subsidiary to the mangrove in stopping the wind and defending the sea wall, while economic timber forests are mainly fast-growing Eucalypts. In recent years, excessive farming and fish farming on the shores has been threatening the healthy growth of the mangrove. Because all lands are owned by the state and the collectives, the Shankou Reserve is not authorized to manage the land within the reserve, which is a big problem for management of the area.

山口保护区土地利用方式主要是农业耕地和农林林地。坡地上主要是少量以旱地作物为主的农业耕地。有着“海岸卫士”美誉的红树林，御台风、消海浪、护海堤，默默守卫着周边社区的基本农田；林场包括防护林用地和经济林用地。防护林是红树林防风固堤的有益补充，而经济林则以大面积种植在保护区周边的速生桉树为主。此外，保护区范围内大面积的海滩涂，随着近年来海水养殖业的不断深入发展，滩涂垦殖利用成为热点。过度无序的滩涂垦殖无疑是与红树林争夺生存环境，直接危及了红树林的生长与发展。由于土地所有权分归国家和集体，山口保护区只享有对区内红树林的管护权，无权干预保护区内的土地利用。这又成为山口保护区在管理中面临的一大难题。



The Population Density Map of Shankou Mangrove Biosphere Reserve

山口红树林生物圈保护区人口密度图



54,384 people (9,827 households) live in the 15 villages of the three towns of Shankou, Shatian, and Baisha in the Nature reserve, among them 27,210 are men and 21,174 are women. The working population account for 43% of the total population (23,471). Average arable land per person is only 0.0005 km², and average water field is less than 0.0002 km² per person. Agriculture accounts for less than 17% of total income, while fishing is the main source of income for the locals, accounting for 50% of income. 20% of the population makes a living from fishing in the ocean, while the rest (80%) rely on aquaculture and fishing in the neritic areas. Marine fish farming is the pillar industry, and it is the main threat to mangroves.

山口红树林生物圈保护区50公里长的陆岸过渡区上，居住有山口、沙田、白沙三个镇所属的15个村委会，9827户，54384人（男27210人，女21174人），劳动力23471人，占总人口数的43%。保护区周边村民的人均耕地仅0.0005km²，而且其中水田只占0.0002km²，农业收入不到总收入的1/6，渔业收入是当地村民的主要经济来源，约占当地经济总收入的50%。其中以海洋捕捞为业的人口只占保护区周边总人口的1/5，而靠海水养殖和浅海挖捕为业的人口却占总人口4/5。海水养殖业成为当地经济的一大支柱产业，富裕的水产养殖户的示范效应令当地村民开展海水养殖的愿望非常强烈，海产养殖业开始与红树林争夺滩涂……

The Pictures of Most Important Flora & Fauna of Shankou Mangrove Biosphere Reserve 山口红树林生物圈保护区典型动植物区系



1	2	3
4	5	6

(1) *Rhizophora stylosa*

Rhizophora stylosa is tall, with a maximum height of 6.5 meters. Average height is 5.3 meters, while average width is 6.6 cm (maximum width is 12.6 cm). The aerial roots originate from the bottom trunk and branches and penetrate deep into the soil to absorb nutrition and help breathing, and its descending axis is so exuberant and rare to be seen in China. The R.S in Luoying and MaAnling core zone are the oldest and best-kept mangrove gene pools of China, and are of great scientific value.

(2) *Bruguiera gymnorrhiza*

Bruguiera gymnorrhiza is a slow growing evergreen tree, with a dark green appearance. Usually it's 5 to 7 meters high and 7 to 22 cm wide. Commonly seen in the mid and inner shore areas, and is located outside Luoying management station. It's resistant to salt and can grow to 70 to 80 years old. It may become extinct in Guangxi as the hardened soil stops the seeds from growing.

(3) *Aegiceras corniculatum*

Aegiceras corniculatum is an evergreen bush of a yellow green color, usually 1.2 to 1.5 meters high with a root area of about 15 to 30 cm (because of constant logging). It grows in muddy shores and can reach heights of 2.1 meters. It's seen in the mid and inner shores of the reserve, in Ximi river, the Dandou sea, and the Majiao River mouth. The best water for A. C. has a salt content of 5 to 10%. It's strong at natural regeneration by seeding, budding seedlings are often seen in near shores and empty lands in the woods. It can often be seen with *Kandelia candel*.

(4) *Avicennia marina*

An evergreen bush of silver-grey, height 1.5 to 2 meters, no trunk is visible. A 7 meter high *Avicennia marina* is found in the reserve and is called the King *Avicennia marina* in China. Naturally distributed around low tide lines, and sometimes in the inner and mid shore areas. It can be seen in all sectors of the reserve, and the biggest is in Dandou sea. The fruit of the tree were used as food in times of near starvation by locals.

(5) Chinese horse shoe king crab

This ancient and endangered crab is found in sub-tropical seas of China. They have existed for 400 million years (from before the time of the dinosaurs). 50 elements are found on the crab that is of high medical value. Illegal killing, selling and eating of the crab is rampant in China and the species is under threat. It's listed as key state protected marine wildlife in China. The Shankou Reserve is paradise for the Chinese horse shoe king crab, they often appear in pairs on shores after the tide goes out.

(6) *Chen et Yeh* (*Phascolosoma esculenta*)

Nick named as "mud patches", *Chen et Yeh* is round and long, with pointy head and dark brown color, and is a permanent resident of the mangrove. They live and look for food in soil 20 to 40 cm deep, and eat and digest the organic material in the mud. It lives only in clean environments, so can't be found on polluted sea shores. Therefore, it's called the "touchstone of shore quality" (an indicator species).

(1) 红海榄 (*Rhizophora stylosa*)

红海榄树形高大，平均林高5.3 m，平均胸径6.6cm，最高可达6.5m，最大胸径可达12.6 cm。红树林从根颈、树干和树枝发出的气根向下斜展分枝、增长增粗，最后插入土壤，吸取养分，帮助呼吸。其繁茂发达的支柱根系为国内所罕见。山口保护区英罗管理站马鞍山核心区的红海榄林是我国大陆海岸保存最古老、面积最完整的基因库，科研价值极高。

(2) 木榄 (*Bruguiera gymnorrhiza*)

常绿小乔木，外貌深绿色，自然生长缓慢，单层或2层结构，林高5~7 m，胸径7~22 cm。常分布于中内滩红海榄的内侧，部分地段形成木榄-桐花树群落。英罗管理站海堤外半硬化淤泥上狭带状分布的小片木榄林，内缘常有黄槿、杨叶肖槿、海漆以及苦兰盘等伴生，木榄耐盐和抗盐性强，树龄多在七、八十岁左右。由于硬化土壤已不利于木榄天然下种更新，其自然发展受阻，在广西海岸存在濒危的可能。

(3) 桐花树 (*Aegiceras corniculatum*)

常绿单层灌木群落，外貌黄绿色，林冠平整，高度1.2~1.5m，生长在淤泥滩上的平均高可达2.1m以上，常因遭受砍伐而多呈丛生状，基部直径可达15~30cm，覆盖度80~100%，桐花树多分布于山口保护区海岸的中滩到内滩，洗米河口区域和丹兜海马交河口一带最为常见。桐花树最适生长的土壤盐度为5~10%，它的天然下种更新能力强，近岸或林中空地常见桐花树萌芽的幼苗群，并常与秋茄在部分地段形成桐花树+秋茄复合群落类型。

4) 白骨壤群落 (*Avicennia marina*)

白骨壤常绿单层灌木群落，结构简单，仅为一层，外貌银灰色，覆盖度40~80%，高度约1.5~2.0m，无明显主干。(山口保护区发现一棵高约7米的白骨壤，可称得上是中国白骨壤之王。)天然分布于低潮线附近，也有分布到中内滩，保护区各岸段均有分布，丹兜海一片面积最大。白骨壤的果实被当地群众称为“榄钱”；在历史上的饥荒年代，“榄钱”是人们赖以生存的渡荒粮食。

(5) 中华鳖 (Chinese horse shoe king crab)

古老珍稀的中华鳖生活在亚热带海域；属节肢动物，甲壳类。它的出现比恐龙还早，四亿年前就具有和现在相同的形态，被称为海底活化石。中华鳖身上富含医药价值极高的50多种生化物质，近些年来，非法宰杀、出售、食用中华鳖的现象屡禁不止，鳖资源在中国衰退严重，中华鳖目前已被列为国家重点保护海洋野生动物。山口红树林保护区确是中华鳖繁衍生息的“天堂”，它们一般都是成对出现，海潮退后的沙滩上常能见到它们“恩爱”的身影。

(6) 可口革囊星虫 (*Phascolosoma esculenta*)

在两广沿海俗称“泥丁”，属星虫纲海洋底栖动物，虫身圆长，头部稍尖，黑褐色，是红树林滩涂的永久性居住者。它们的栖息和取食都在20—40厘米深的土壤中，是红树林湿地典型的食碎屑动物。它们吞食泥沙，消化泥沙中的有机质。“泥丁”生长“讲究清洁”，凡被工业、农业、渔业严重污染的海滩涂再也寻不到它们的踪迹，因此，它们被喻为“近海环境质量的试金石”。

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