



World Heritage Sites

Protected Areas and World Heritage



**THREE PARALLEL RIVERS OF YUNNAN PROTECTED AREAS
YUNNAN, CHINA**

This vast complex comprises eight clusters of largely mountain protected areas in northwest Yunnan where the Tibetan plateau bends south, breaking into steep glaciated chains running north-south, between which the 2,000m deep gorges of the upper Yangtse (Jinsha), Mekong (Lancang) and Salween (Nu) rivers run parallel for over 300 km. It is a landscape of very great topographic, geologic and climatic variety, scenic beauty and unparalleled biological diversity. There are 118 peaks over 5,000 meters high, glaciers, waterfalls and hundreds of small lakes. Owing to its range of elevations, its location on the boundaries of three major bio-geographical realms - east Asia, southeastern Asia and the Tibetan plateau - and as an ecological corridor between north and south, it contains most of the Palaeartic temperate biomes from alpine to southern sub-tropical. It is an epicentre of Chinese biodiversity with over 6000 species of plants, a quarter of which were first discovered there, and, it is claimed, over 25% of the world's animal species, many of them relict and endangered, the type localities of more than half of which are found in the area.

Threats to the Site: The government is proposing to build some 28 dams for these gorges as an essential contribution to the national economy. Construction of one, on the upper Yangtse River, has already begun. A 2006 map of proposed boundary changes showed major alterations in the boundaries and areas originally submitted for World Heritage status.

COUNTRY The People's Republic of China - Yunnan

NAME Three Parallel Rivers of Yunnan Protected Areas (*Sanjiang Bingliu*)

NATURAL WORLD HERITAGE SERIAL SITE

2003: Inscribed on the World Heritage List under Natural Criteria vii, viii, ix and x.

INTERNATIONAL DESIGNATION (PART)

2000: Gaoligong Mountain recognised as a Biosphere Reserve under the UNESCO Man and Biosphere Programme (293,564 ha).

IUCN MANAGEMENT CATEGORY

	<u>core</u>	<u>buffer</u>	
Gaoligongshan National Nature Reserve	I	II	[Strict Nature Reserve / National Park]
Gongshan Scenic Area	-	-	
Yueliangshan Scenic Area	-	-	
Pianma Scenic Area	-	-	
Haba Xueshan Nature Reserve	I,II	III	[SNR / National Park/ Habitat-Species Manag't Area]
Julong Lake Scenic Area	I	-	[Strict Nature Reserve]
Bitu Lake Nature Reserve	I,II	II	[Strict Nature Reserve / National Park]
Yunling Shan Nature Reserve	I	IV	[SNR / Habitat-Species Management Area]
Hongshan Scenic Area	II	IV	[Nat.Park / Habitat-Species Management Area]
Baimang Xueshan Nature Reserve	II	IV	[SNR / National Park/ Habitat-Species Manag't Area]
Meili Xueshan Scenic Area	II	-	[National Park]
Laojunshan Scenic Area	II	III	[SNR / Habitat-Species Management Area]
Qianhushan Scenic Area	II	-	[SNR / Habitat-Species Management Area]
Laowoshan Scenic Area	II	III	[National Park / Natural Monument]

Note that the above IUCN management categories are cited from the nomination document. They may need to be confirmed with national authorities if there is uncertainty over their interpretation.

BIOGEOGRAPHICAL PROVINCE

Szechuan Highlands (2.39.12)

GEOGRAPHICAL LOCATION

The site is in Yunnan, south-west China, about 350 km northwest of Kunming, bordering Myanmar on the west, Tibet to the north and Sichuan Province on the east. It is a cluster of eight composite sites containing 15 protected areas. It is situated in the high parallel ranges of the Hengduan Shan (Mountains) which run from north to south between the long parallel gorges of three great rivers: the Yangtse (Jinshajiang), Mekong (Lancangjiang) and Salween (Nujiang). The complex extends 310 km from 29° 00'N to 25° 30'N and 180 km 98°15'E to 100°20'E.

DATES AND HISTORY OF ESTABLISHMENT

- 1983: Gaoligong Shan and Baimang Xueshan (snow-mountain) National Nature Reserves designated;
- 1984: Bita and Napa Lakes, Haba Xueshan and Yunling Shan Provincial Nature Reserves designated; the Baimang and Haba reserves were created to protect the endemic Yunnan monkey;
- 1986: Laojun Shan reserve designated;
- 1986: National Interim Rules on the Management of Scenic and Cultural Resorts decreed; and made the responsibility of the Ministry of Rural & Urban Construction & Environmental Protection;
- 2000: Overall plan for the protection and management of the property submitted to the central government; the property designated a UNESCO Biosphere Reserve;

LAND TENURE

The People's Republic of China, Yunnan Province, in Diqing Tibetan Autonomous Prefecture, Nujiang Lisu Autonomous Prefecture and Lijiang Prefecture. The site is administered by the Management Office of the World Heritage Site Management Committee of Yunnan Province, under the national Ministry of Construction with the help of representatives of other Ministries, Institutes and academics.

AREAS

The nominated site covers 1,698,419.2 ha, in seven clusters containing fifteen core areas of 939,441 ha plus 758,978 ha of buffer areas (Yunnan Management Bureau, Dec., 2002).

<u>Protected Area</u>	<u>core area</u> [ha]	<u>buffer area</u> [ha]	<u>total area</u> [ha]	<u>coordinates</u>
Gaoligong Shan Nature Reserve + Pienma, Yueliang Shan & Gongshan Scenic Areas	305,306.1	208,716.3	514,022.4	27°53' N 98°24' E
Hong Shan Scenic Area + Bita Lake Nature Reserve	205,603.8	159,083.6	364,687.4	28°12' N 100°07' E
Baima-Meili Xueshan Nature Reserve+ Julong Lake Scenic Area	267,507.8	81,511.0	349,018.8	28°00' N 99°10' E
Haba Xueshan Nature Reserve	67,976.0	132,339.4	200,315.4	27°30' N 100°10' E
Laojun Shan Scenic Area	44,265.0	87,161.0	131,426.0	26°45' N 99°45' E
Qianhu Shan Scenic Area	39,629.6	58,910.4	98,540.0	
Yunling Shan Nature Reserve	31,346.0	58,441.4	89,787.4	26°40' N 99°15' E
Laowo Shan Scenic Area	17,426.2	31,735.0	49,161.2	27°00' N 99°00' E
Totals	939,441.4	758,977.8	1,698,419.2	

Note: A map of proposed property boundary changes given to the IUCN/UNESCO Mission of 2006 showed reconfigurations of the boundaries and reductions in the areas, in several cases of over 10%, of all the properties except Qianhu Shan. Notable omissions are on the Myanmar border in the Gong Shan and Yueliang Shan Scenic Areas and in the northern third of Yunling Shan Nature Reserve. All omitted areas revert to the status of development zones, many changes being due to the need to accommodate existing mining operations. No revised area figures were quoted (Lopoukhine & Jayakumar 2006).

ALTITUDE

Ranges from 760m to 6,740m: Mt. Kawagebo in the Meili Mountains, a range of glaciated peaks over 6,000m high on the Tibetan border. Over 118 peaks in the World Heritage area are higher than 5,000m.

PHYSICAL FEATURES

Three Parallel Rivers of Yunnan Protected Areas World Heritage site stretches 310 km from north to south and 180 km from east to west in remote, forested back-country. It lies over four parallel north-south trending mountain ranges that reach over 4,000m above sea level. From the west these are: the Gaoligongshan on the Myanmar border, the Nu Shan (Meili Shan, Biluo Shan and Laowo Shan ranges), the Baimang-Yunliang Shan and Laojun Shan ranges and the lower Qianhu Shan and Hong Shan ranges on the east. These ranges are all part of the Hengduan Mountains beyond the eastern end of the Himalayas, which have been corrugated and uplifted by the pressures of crustal folding. The western ranges bear cloud forest that becomes tropically dense in the south. The northern mountains are barer but snow-capped, culminating in Mt. Kawagebo close to the Tibetan border, from which flows the southernmost glacier in China, Mingyongqia. The three great rivers the Yangtse (Jinshajiang), Mekong (Lancangjiang) and Salween (Nujiang), flow parallel through the site for some 270 km from north to south through steep parallel gorges which are in places 2,000m deep. At their closest, the three gorges are 18 and 66 kilometres apart. The Mekong runs through a gorge 310 km long. For 250 km a fourth river the Dulongjiang (Nmai), runs parallel in Myanmar. Most of the valley floors lie outside the nominated areas.

The site is dominated by a huge composite orogenic belt that shows the signs of powerful crustal movements in the past, notably the compression of the edge of the Eurasian plate by the underlying Indian plate which is being subducted along the line of the Lancang River fault. The resulting squeeze created vast thrust-nappes, violent shearing and uplift into high mountains - the Hengduan Mountains and the Qinghai-Tibet Plateau - through which pre-existing rivers continued to cut, resulting in the extreme vertical relief which characterizes the area. There is a wide range of rock types which reveal the area's past marine evolution under the Tethys and neo-Tethys seas (a shallow sea that existed during the early Mesozoic Era and was the body of water that separated the landmass of Laurasia in the north from Gondwanaland in the south), which have been powerfully deformed by the collision. Some of the results are visible in complex patterns of folded rock and unusual mineral formations. Four types of igneous rock are evident: ultrabasic, basic, intermediate acid and alkali rock as well as fairly well developed ophiolite (exposed oceanic mantle of basalt, gabbro and peridotite), in association with deep-water silicalite.

The area is also an excellent representative of alpine landscapes and their evolution. The eastern mountains, plateaus and valleys are covered with meadows, waterfalls, streams and hundreds of small glacial lakes left by glacial erosion: 424 glacial lakes, glacial moraines and other glacial landforms. A variety of outstandingly scenic alpine karst features exist within the nominated area. They include karst caves such as the 'Stone Moon Cave' in the Fugong and Walaya cave system in Lushui, calcareous tuff deposits (Baishuitai in Zhongdian and Shigu-Shitou in Lijiang) and alpine karst peak clusters (Binzhongluo in Gong Shan, Wongshui and Gezan in Zhongdian, Shigu-Shitou in Lijiang) created by glacial action and associated erosional processes. There are notable examples of Quaternary alpine and modern glaciers, such as Mingyongqia, Siqia and Haba. The Mingyongqia glacier falls from Mt Kawagebo to 2,700m, and is claimed to be the lowest glacier in the northern hemisphere at that latitude (28°N). There are large areas of granite erosional peaks (Fugong to Gong Shan) and alpine *Danxia* landforms - old Tertiary monoliths of red calcareous sandstone eroded by wind and water. A typical area illustrating this is Lijiang Liming. Such varied terrain gives the region great scenic as well as geological interest. The site's protected core nature reserves and scenic areas all lie within the watersheds of the three gorges:

- a) In the Nujiang River watershed the large Gaoligong Shan National Nature Reserve includes the Dulong River valley and two separate areas further south which, with the Yueliang Shan core reserve, are connected by the Gong Shan, Yueliang Shan and Pianma Scenic Areas;
- b) In the Lancang River watershed are the western half of the large Baimang Xueshan National Nature Reserve, the Meili Xueshan Nature Reserve and Scenic Area, and the Julong Lake Nature Reserve and Scenic Area; further south, are the Laowo Shan core reserve & Scenic Area, and the Yunling Shan proposed Nature Reserve;
- c) In the Jinsha River watershed are the eastern half of Baimang Xueshan National Nature Reserve, and in the east, the Bita and Napa Lake Provincial Nature Reserves with the Hong Shan (Red Mountains) core reserve & Scenic Area, the Haba Xueshan Provincial Nature Reserve, Haba Xueshan Nature Reserve & Scenic Area, the Qianhu Shan core reserve & Scenic Area, and in the southeast, the two core reserves and Scenic Areas in the Laojun Mountains. All the land between these areas is buffer zone.

CLIMATE

The climate of the site is as varied as its topography. The west side of the area receives the Indian Ocean south-western monsoon, which is trapped against the Tibetan plateau, creating permanent snow-cover on peaks over 5,000m. The Pacific Ocean southeastern monsoon affects the southeast less strongly, while frigid airflows from Qinghai and Tibet in the north, bring a cooler sub-humid climate to the north and north-east margins of the area. The central region experiences föhn winds from the west and the south to heights below 1,000m elevation, creating humid near-tropical conditions. Annual rainfall ranges from 4,600mm in the far west (Dulongjiang valley) falling mainly in summer, to 300mm in the rain-shadowed upper Yangtse valley in the north. Persistent fog limits the development of settlements above 2,400m. Temperatures vary from subtropical in the valleys to frigid on the snow-covered peaks.

VEGETATION

The area covered by the World Heritage site is claimed to be the most biodiverse and least disturbed temperate ecosystems in the world. It supports the richest diversity of higher plants in China with a wide range of fungi and lichens, is an epicentre of Chinese endemic species and a natural gene pool of great richness. Owing to its wide variety of rock and soil substrates, altitudinal range and its position in a climatic corridor between north and south, it includes the equivalents of seven climatic zones: southern, central and northern subtropical with dry hot valleys, warm, cool and cold temperate, and cold zones. Because it was a refuge during the last ice age and its location is near the boundaries of three major bio-geographical realms, east Asia, southeastern Asia and the Tibetan plateau there is marked differentiation in the vegetation of the area from relict and primitive to highly evolved species. These comprise 22 vegetation subtypes and 6,000 species, over 20% of China's higher plants. 2,700 of these are endemic to China and 10% are endemic to the area, in 45 endemic genera, with the type localities of 1,500 plants. 8.5% of China's rare and endangered species have been recorded there. Of these 33 are nationally protected, 12 being rare, 22 threatened and 37 having province-wide protection.

The range of vegetation types of the area includes:

- o Evergreen broadleaved forests: monsoon, humid, semi-humid, higher humid;
- o Sclerophyllous evergreen broadleaf forests: cold temperate mountains, hot dry valleys;
- o Deciduous broadleaf forests of *Quercus* and *Alnus* spp.
- o Warm coniferous forests: warm-hot, warm temperate, coniferous-broadleaf forests;
- o Temperate coniferous forests: temperate cool *Picea* + temperate cold *Abies* forests;
- o Savanna shrublands: dry hot savanna;
- o Shrublands, dry warm valleys, cold temperate;
- o Meadows, sub-alpine, alpine;
- o Alpine debris-flow scrub;
- o Alpine lacustrine: emergent, floating-leaf, submerged.

Monsoon forest occurs in the lower reaches of Dulong and Nujiang Rivers while semi-humid evergreen broadleaved forest occurs in the lower reaches of Lancang and Jinsha Rivers. Middle subtropical humid evergreen broadleaved forests are found on the mid-slopes of Gaoligong Shan and Biluo Xueshan. Subtropical sclerophyllous evergreen forest along the middle reaches of the Lancang and Jinsha rivers are dominated by *Quercus* species. Temperate deciduous broadleaved forest occurs at an altitude of 3,000-3,500m. Warm to cool coniferous forest grows at an altitude of 2,800-3,300m and cold-

temperature coniferous forest at 3,300-4,100m. A dry-hot savanna-like ecosystem appears in river valley areas of the lower reaches of the Lancang and Jinsha rivers, while a microphyllous shrubland (desert) ecosystem of dry-warm river valleys occurs in the upper reaches of the Lancang and Jinsha rivers. Alpine meadows predominate above the tree line around 3,500 to 4,000m. In Gaoligongshan, Nushan and Yunlingshan mountains these are interspersed by Alpine shrublands (4,000-4,500m) dominated by many rhododendron species. Alpine debris-flow ecosystems occur between 3,500 to 4,500m in the Nushan and Yunlingshan.

The most abundant plant types are northern temperate (20.2%), pan-tropical (14.2%), tropical-Asian (13%) and East Asian (13%). The very wet western border with Myanmar is forested with subalpine conifers (fir and spruce) mixed with broadleaf evergreens with a flora closely related to the eastern Himalayan along with much sub-tropical scrub. In the cloud forests, trees are draped abundantly with the lichen *Usnea longissima*. The Nu and Lancang river gorges have tropical scrub fringed by mixed coniferous and broadleaf forest, which is especially rich in mid-elevation temperate conifers, some endemic to the gorges. These include Chinese cypress *Cupressus duclouxiana* (EN), Taiwania *Taiwania cryptomeroides* (VU), hemlock *Tsuga dumosa*, and *Juniperus* spp. Other endemic or locally common rare conifers are from the genera *Keteleeria*, *Pseudotsuga*, *Platycladus* and *Cunninghamia*. Broadleaf forests are often dominated by the subalpine oak *Quercus aquifolioides*. On the mountains to the east of them, forests of Likiang spruce *Picea likangensis* and *P. brachytyla* from 3,100-3,500m and Chinese fir *Abies georgei* and *A. delavayi* from 3,500-4,000m predominate, associated with Chinese larch *Larix potanini* and *Pinus densata* on cleared or disturbed ground. The whole area is characterised by isolated ridge top and valley bottom habitats. The drier plateau of the Hongshan in the east is dominated by Yunnan pine and alpine meadows, and the rain-shadowed Yangtse valley by sparse dryland scrub.

There are more than 200 species of rhododendrons, 37 of them discovered in the area, over 300 species of timber trees, more than 100 species of gentians and primulas, many species of lily and orchid, and some 500 species of medicinal plants. Well known endemic plants include ginkgo *Ginkgo biloba* (EN) and davidia (handkerchief tree) *Davidia involucrata*, four species of the blue poppy *Mecanopsis*, and two species of *Cycas*. There are also ancient relict species such as *Taiwania*, the Yunnan yew *Taxus yunnanensis*, *Magnolia rostrata* (VU), *Nouelia insignis* and *Kingdonia uniflora* among many others.

FAUNA

The area is the most outstanding region in China for animal diversity. Most of China's rare and endangered animals occur within it, especially in the western Gaoligong and Yunling Mountains. The fauna is a complex mosaic of palaeoartic, oriental and local endemic species adapted to nearly all the inland climates from southern subtropical to frigid, except for desert, though there are hot dry valleys. The area is believed to support over 25% of China's animal species, many being relict and endangered. In addition the type localities of more than half of them are found there. The records list 173 mammals (81 endemic), 417 birds (22 endemic), 59 reptiles (27 endemic), 36 amphibians (25 endemic), 76 fish (35 endemic) and 27 (8 endemic) papilionid species. There is a concentration of the country's rare and endangered animals within the nominated area. 80 are listed in the Red Book of Chinese animals, 20 of which are considered endangered, 79 animals were listed on the CITES 1997 appendices, 57 are listed in the IUCN Red List of the world's Threatened Animals, 6 of them endangered. Being near the boundaries of the east Asian, southeast Asian and Tibetan biogeographic realms, the area also acts as a corridor where several species from each realm meet and reach their limits of distribution. In addition there are numerous primitive animals that are relics of the ecological past, alongside animals that have recently adapted to colder conditions.

Two-thirds of the fauna occurring in the nominated area are either endemic, or are of Himalayan-Hengduan and Hengduan Shan types. However, animals typical of North temperate and old continent temperate zones, the Qinghai-Tibetan plateau/central Asian zone, the East Asian zone, and of the Tropical Africa/tropical Asia-continental temperate type, the Tropical Asia-temperate Asia type and the Tropical Asian type are also present. The narrow range of the Gaoligong Shan on the border with Myanmar, the Nu and Lancang River valleys and the mountains between and east of them, hold most of

the endangered species. The mosaic is enriched by the wide variety of altitude-related species, the greatest density of which is located in the mid-level forested belt of the mountains the elevation of which rises on the mountains of the climatically drier east.

Among the rarer mammals of the area are: the Tibetan watershrew *Nectogale elegans*, Chinese shrew-mole *Uropsilus soricipes* (EN), the endemic Yunnan snub-faced monkey *Rhinopithecus bieti* (EN), capped leaf monkey *Trachypithecus pileatus* (EN), stumptail monkey *Macaca arctoides* (VU), Assamese macaque, *M. assamensis* (VU), Gaoligong pika *Ochotona gaoligongensis*, wild dog *Cuon alpinus* (EN), red panda *Ailurus fulgens* (EN), Asiatic black bear *Ursus thibetanus* (VU), smooth-throated otter *Lutra perspicillata* (VU), leopard *Panthera pardus*, snow leopard *Uncia uncia* (EN), clouded leopard *Neofelis nebulosa* (VU), Gongshan muntjac *Muntiacus gongshanensis*, musk deer *Moschus moschiferus*, takin *Budorcus taxicolor* (VU), red goral *Naemorhedus baileyi* (VU) and long-tailed goral *N. caudatus* (VU).

The area has the richest assemblage of birds in China. Among the rarer birds are ferruginous duck *Aythya niroca*, Chinese grouse *Bonasa tetrastes sewerzowi*, chestnut-throated partridge *Tetraophasis obscurus*, Yunnan white-eared pheasant *Crossoptilon crossoptilon*, Lady Amherst's pheasant *Chrysolophus amherstiae*, blood pheasant *Ithaginis cruentus*, Sclater's monal pheasant *Lophophorus sclateri* (VU), Malay peacock pheasant *Tragopan blythi* (VU), black-necked crane *Grus nigricollis* (VU), Ward's trogon *Harpactus wardi*, giant nuthatch *Sitta magna* (VU), Yunnan nuthatch *S. yunnanensis* (VU), white-speckled laughing thrush *Garrulax bieti* (VU) and the brown-winged parrotbill *Paradoxornis brunneus*. Although the main rivers are mostly below the level of the World Heritage sites, 48 species of fish, 16 being endemic to these fast cold streams, may be affected by proposed damming.

CULTURAL HERITAGE

Among the estimated 278,329 people living within the boundaries of the complex, 13 ethnic groups exist, among them the Tibetan, Yi, Miao, Bai, Lisu, Pumi, Nu, Dulong and Naxi peoples. Many of these ethnic groups preserve unique customs and traditions, the Naxi in the Jinshajiang valley being a rare example of a matrilineal society. In many areas of the complex, villages contain traditional houses and terraced hillside farms well adapted to their environment. The management plan developed for the nominated area urges government agencies responsible for management of the site to develop action plans to preserve the cultures and traditions of such ethnic groups. The government intends to preserve 31 of these traditional villages, in order to realise their potential for tourism. They are representative of Tibetan, Naxi, Bai, Lisu, Nu, Pumi and Dulong cultures and are close to the scenic zones near Laowo River Gorge and the Xiaojiang area.

LOCAL HUMAN POPULATION

An estimated 278,329 people live within the boundaries of the Three Parallel Rivers of Yunnan Protected Areas site, 36,512 of whom are located in core areas of the site. Local jurisdictions include Diqing prefecture in the east, centre and north, Nujiang prefecture in the west and south and part of Lijiang county in the southeast. Diqing prefecture comprises Zhongdian, Weixi and Deqin counties and county towns of the same names. Nujiang prefecture comprises Gongshan, Fugong, Liuku, and Lanping counties with county towns of the same names. Zhongdian located in the east of the nominated area is the chief administrative centre. A few major roads parallel the lie of the land, with occasional links. Zhongdian is located on one of the three main routes from west Sichuan and Yunnan to the south and Myanmar. There is some mining activity in the locality, although this is now illegal on state land. The main agricultural crops grown include maize, barley, walnuts and chestnuts in valley bottom and terraced hillside farms. Above 2,400m, persistent fog in the growing season means that such land has not been settled.

The Government of China arranged the relocation of people living in high altitude ecologically sensitive areas of the World Heritage site in a poverty-alleviation program. By 2003 approximately 36,000 people from seven main areas of the site had been relocated. This is an estimated 9,000 households of which 1,500 households lived in core areas, the remainder in buffer zones, mostly from the Gaoligong Shan, Haba Xueshan and Hong Shan ranges. The people are mainly relocated to Dali and Simao Prefectures where there is more farmland. A further 19,500 people were to be relocated from the area, 60% of whom

inhabited core zones of the site in 2003.

VISITORS AND VISITOR FACILITIES

Despite its remoteness, the area's unparalleled scenic, geologic and ecological variety, rare flora and fauna and the cultural diversity of its peoples, have begun to attract tourists, who numbered 188,560 in 2001. Visitor statistics for 1999-2001 indicate that visitor numbers have been steadily rising for most protected areas of the site. 85-95% of visitors were from China, with 5-15% from overseas. There are currently over 2,000 hotel beds in the Gaoligongshan National Reserve area. There are plans to develop driving, riding, trekking and boating activities with service centres in the main six and 17 smaller towns within the World Heritage Area. Among the snow-covered mountains, alpine lakes, meadows, streams, waterfalls and immense gorges 188 scenic sites have been identified. They include fantastic rock formations, karst cliffs and caves and terraces of calcareous tufa. 40 scenic sites have been established already, with parking, signposts, information panels, toilets and garbage collection. However, to ensure their preservation, core reserve zones are not open to tourists. It is government policy to establish cooperatives for tourism, focusing especially on the traditional cultures of the minority ethnic groups which are being preserved in 31 villages of those native peoples who still remain in the area after relocation of the majority. In anticipation of international tourism, the main local town of Zhongdian in the northeast has been renamed Shangrila.

SCIENTIFIC RESEARCH AND FACILITIES

In addition to records dating from Ming and Tang times, over 100 Chinese references are quoted in the nomination bibliography, including 24 on geology, 22 on general topology, 22 on flora and forests, 16 on fauna, 8 on birds and 15 on culture and history. Western records are believed to have started from the visit to the area in 1883 by the French missionary Delavay, since when several famous botanists have travelled and collected in the area. The Chinese Academy of Sciences, Beijing University and the Kunming Institute of Ecology along with many other investigators, including foreign institutions, have made many studies in the region. The China Council for International Cooperation on Environmental Development and the Chinese Biodiversity Working Group have drafted technical reports on nature reserve management, grasslands, invasive and endangered species, the use of native species, and traditional medicine.

CONSERVATION VALUE

This is an area of unparalleled biological diversity, unusually explicit geological and landscape variety and great scenic beauty. As well as the three great rivers there are high peaks, glaciers, hundreds of small glacial lakes and most of the palaeartic temperate biomes from alpine to southern sub-tropical. This is due to the altitudinal range, the area's role as an ecological corridor between north and south and its location near the boundaries of three major bio-geographical realms: east Asian, southeastern Asian and the Tibetan plateau. It has over 6,000 species of higher plants of which a quarter were discovered in the area, and over 25% of the world's animal species, many relict and endangered, the type localities of more than half of which were found in the area. The sites lie within a Conservation International-designated Conservation Hotspot, a WWF Global 200 Freshwater Eco-region, a WWF/IUCN Centre of Plant Diversity and is in one of the world's Endemic Bird Areas. It also contains a UNESCO Biosphere Reserve.

CONSERVATION MANAGEMENT

Conservation of the area is now under the control of five national, seven provincial and four local administrations, co-ordinated since 1995 by the Three Parallel Rivers Scenic and Cultural Resort Provincial Management Office. The property itself is administered by the Management Office of the World Heritage Site Management Committee of Yunnan. The Construction Department of the Yunnan Provincial Government developed a Master Management Plan for 2001-2020 for the area, including the World Heritage sites. It was concerned to develop scenic zones for tourism, building the necessary infrastructure during 2001-2006, then expanding and improving it in phases: first overall planning for the area, then action plans for the scenic zones in general, then in detail, and then of scenic sites. The guiding principles were to maintain ecological equilibrium between man and nature and to promote ecological conservation and conformity to existing laws. The plan was to preserve the ethnic cultures, focusing on certain villages, retaining their biological, cultural and landscape diversity and developing their economic potential in environmentally friendly ways while relocating most of the other villagers out

of nominated World Heritage sites above 2,000m. Staff training and public awareness programs were planned in satellite and aerial photography, and programs for monitoring the hydrology, ecology, fires, pollution, forest disease and tourist movements. However, there is little regular monitoring of wildlife within the core zones.

On the national scale, the State Forestry Administration is investing billions of dollars in nature conservation and protection for the 2000-2010 period through schemes such as the National Natural Forest Protection, Grain to Green, National Endangered Plant and Wildlife Protection and Nature Reserve Programmes. These projects aim to reduce erosion from deforestation, reduce cultivation of sloping lands and to re-train loggers. They will be continued, especially in the heavily deforested upper Yangtse watershed. The Yunnan Great Rivers Project initiated by the U.S. based Nature Conservancy (TNC), working with the provincial government, aims to integrate conservation and sustainable development in the area as a pilot scheme for the country. This development will be outside the core areas of greatest biodiversity, which remain closed to the public, except for restoration and approved scientific study. The protected areas that include the nature reserves and scenic zones will be open for controlled visitation. The buffer zone is open to a wider range of uses. Commercial logging, which has destroyed much old-growth forest cover, causing erosion and drastic flooding downstream, was recently made illegal on state land. Slopes over 25% are now to be used for forest or grazing only, and people living above 2,000m will be moved. Polluting and high-energy use activities are prohibited within the zones.

By 2003 an Action Plan for the Three Rivers Protected Areas by the Site Management Bureau had been approved by the provincial government and submitted to the IUCN. A Monitoring Plan, Indigenous Peoples Support Plan, Regional Movement Plan and Publicity and Education Plan were all to be approved in 2004. Nature Reserves are divided into Core Zones open only to scientific studies, Buffer Zones not open to commerce, and Experimental Zones, open to visits and tourism. However, the zones are not clearly delineated. By 2006, management plans for each of the properties had been formulated and most had been approved by the Yunnan Provincial Government, but none existed for the property as a whole. (Lopoukhine & Jayakumar, 2006). New management structures and regulations had been developed, with enhanced funding commitments. Village resettlements and reforestation had begun and marble quarrying halted in the Bingzhongluo area. The State Environmental Protection Administration is responsible for approving Environmental Impact Assessments for large-scale works but none are available. Plans for mining and alteration of the property's boundaries are not yet finalised; plans for the Nuijiang River dams remain under review within Government ministries and are not yet ready for public release; nor, for reasons of national security, can satellite images or contour maps of the area be released. This lack of information raises concerns about the future integrity of the property. The IUCN/UNESCO Mission of 2006 requested a detailed report on these plans accompanied by their environmental impact assessments (Lopoukhine & Jayakumar, 2006).

MANAGEMENT CONSTRAINTS

Sufficient funds for effective management for many of the country's protected areas were lacking for many years. In addition, overlapping administrative mandates and the great distance from the central government have tended to aggravate confusion about management authority and responsibilities (CEPF, 2002), leaving the way open for commercial exploitation both official and unofficial. Since 1980, government policies have promoted rapid economic growth in Yunnan, stimulating the demand for the resources of the area, especially timber: the region lost much of its forest cover during the last fifty years. The conversion of forest to agriculture fragments habitats and can create landslides on slopes. Village forests have suffered from unsustainable demand, resulting in erosion, silting and catastrophic flooding downstream. Fuel-wood cutting in state forests though illegal is still practiced. Overstocking of meadows, especially with sheep and goats, has led to overgrazing. Hunting is also weakly policed. Collecting, especially for the lucrative wildlife trade, is widespread: alpine plants and rare plants and fungi for medicines, leopard skins, bear, musk deer and cat parts, also for medicinal use, are over-harvested. (Some 53% of animal products used in China come from nationally and internationally protected species: CEPF, 2002). World Heritage status has stimulated tourism in the experimental zones, but the very rare black snub-nosed monkey which lives at 3,000m is being driven down to lower levels for the trade. The site's boundaries are also inadequately signed or quite unmarked perhaps

because they are often not yet defined, despite designation. And the improvement of infrastructure has also meant improved commercial access for all of the above activities (Lopoukhine & Jayakumar, 2006).

Nationally, as China's economy develops, there is an increasing shortage of electricity. Eight dams are planned for the Lucangjiang (Upper Mekong) and are a source of great concern to countries downstream. Thirteen dams are approved in principle for the Nujiang (Salween) which will generate 30% more power than the Three Gorges dam. This project will oblige 50,000 people, mainly from minority groups, to relocate (Yardley, 2004) but has been temporarily suspended in deference to objections to the dams from Myanmar and Thailand and a media campaign in China itself (Litzinger, 2004). The relocation of villagers will also increase pressure on viable farmland within the property since much will be lost under the proposed reservoirs. However, little information is being released to the public. Work on one dam, the Liuku dam, has already begun (UNESCO, 2005). Another dam, the Binzhongluo is planned within the World Heritage site but officials assured the IUCNM/UNESCO 2006 mission that future dams would not affect the World Heritage site (Lopoukhine & Jayakumar, 2006). The Yunnan provincial government working with the influential Huaneng Group, China's biggest independent power producer, was already working on the Hutiaoxia dam at Tiger-Leaping gorge on the border of the site in 2004. This is just southeast of the World Heritage buffer area, near the first bend of the Jinshajiang (Yangtse River). The reservoir is intended to dilute the heavily silted and polluted waters of a lake downstream on which the provincial capital Kunming depends. It is known as the Double Three Gorges dam for its proposed contribution to the national electricity grid. Seven further dams are planned for the upper Jinshajiang river which will flood out more than 100,000 people, mostly from minority populations, including the lands of the unique Naxi people. Their construction will pollute waters downstream although they will retain silt which would otherwise fill the Three Gorges dam. The State Forestry and Seismogeographical Bureau with the Chinese Academy of Social Sciences, nine NGOs and local people are opposing this development, work on which, though little publicized, is well advanced (Xin, 2004; Becker, 2004).

STAFF

Protected area staff within the World Heritage sites work for provincial, prefectural and local organisations and government departments responsible for utility construction and maintenance, production, tourism, and natural resource management. The World Heritage Site Management Committee of Yunnan Province in Kunming has a coordinating staff of five, expected to increase to 25, who liaise with prefectural authorities. The site's Management Bureau has some 60 staff operating out of three centres, one per prefecture. Project staff from foreign nature conservation organizations assist with scientific and technical advice, where funding is available. In 2002 the Critical Ecosystem Partnership Fund (CEPF), a joint initiative of Conservation International, the World Bank, GEF, the government of Japan and the MacArthur Foundation studied the Gorges ecoregion amongst other projects with the aim of ensuring its future protection (CEPF, 2002).

BUDGET

Since 1993 the Chinese government has invested RMB 460 million (US\$55,577,000) in the nominated area. Since 1995, the World Bank through the GEF has invested funds to assist the improved management of nature reserves in the region, in capacity building and training, sustainable forestry techniques and the establishment of timber plantations. GTZ(Germany), the Ford Foundation and several foreign governments are also actively supporting the region with financial aid. WWF has launched an Integrated Conservation and Development project in Baimaxueshan Nature Reserve. Between 1997 and 2001 the Nature Conservancy with the Yunnan provincial government invested US\$5 million in regional conservation in Meilixueshan, Laojunshan and the Nujiang gorge (CEPF, 2002) and the Critical Ecosystem Partnership funded the Gorges ecoregion project. Between 2003 and 2008, the provincial government will contribute 15 million yuan (US\$1,812,500) for the daily management and conservation and monitoring of the nominated area, including relocation of villagers out of the core zone.

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DATE May 2003. Updated September 2007.