四川大熊猫栖息地—卧龙·四姑娘山·夹金山脉

世界自然遗产保护规划

THE WORLD HERITAGE
SICHUAN GIANT PANDA SANCTUARY
—WOLONG, MT. SIGUNIANG AND JIAJIN MOUNTAINS

Overall Management Plan

四 川 省 人 民 政 府

The People's Government of Sichuan Province

四川大熊猫栖息地—卧龙·四姑娘山·夹金山脉

世界自然遗产保护规划

四 川 省 人 民 政 府

2002年11月

四川大熊猫栖息地—卧龙·四姑娘山·夹金山脉

世界自然遗产保护规划

顾　　问：陈昌笃　胡锦矗　汪　松　马克平　钱振越

主　　编：杨洪波

副 主 编：卯　辉　张　虎　李建国　许纪存　赵永涛　陈富斌

编　　辑：四川省世界遗产管理办公室

中国科学院·水利部成都山地灾害与环境研究所

撰　　稿：陈富斌　John R.MacKinnon　吕　植　张　虎

英文翻译：吕　植　John R.MacKinnon　钟盛先　李　泳

制　　图：兰立波

四　川　省　人　民　政　府

特别说明

四川省人民政府于2003年1月3日以“川府函（2003）2号”文批准了《四川大熊猫栖息地—卧龙·四姑娘山·夹金山脉世界自然遗产保护规划》。

目　录

1. 提名世界自然遗产地的重要性 ..... (1)

1.1 提名地位置 ..... (1)

1.2 提名地独特的生物学特征 ..... (1)

1.3 具有40年开创性研究和保护活动的历史 ..... (10)

1.4 世界上最大和最成功的大熊猫圈养繁殖中心 ..... (11)

1.5 引人入胜的风景名胜区 ..... (11)

1.6 具有藏、羌民族文化、汉族寺庙、道教和清代天主教的历史遗迹 ..... (12)

2. 遗产地保护现状及面临的问题 ..... (13)

2.1 保护现状 ..... (13)

2.2 社会经济简况 ..... (15)

2.3 面临的环境压力和威胁 ..... (15)

2.4 自然灾害 ..... (18)

3. 遗产地保护管理对策 ..... (19)

3.1 保护管理的目标 ..... (19)

3.2 保护管理的体制 ..... (19)

3.2.1 对遗产地实行功能区规划管理 ..... (19)

3.2.2 管理机制 ..... (22)

3.3 遗产地保护管理项目活动 ..... (23)

3.3.1 管理项目 ..... (23)

3.3.2 监测 ..... (24)
3.3.3 研究 ..... (26)
3.3.4 保护意识的宣传和教育 ..... (26)
3.3.5 管理培训 ..... (27)
3.3.6 旅游管理和生态旅游的发展 ..... (27)
3.3.7 社区可持续发展 ..... (28)

4. 投资概算 ..... (28)

参考文献 ..... (30)

附图 1．四川卧龙–夹金山脉大熊猫栖息地位置图
2．四川卧龙–夹金山脉大熊猫栖息地地形图
3．四川卧龙–夹金山脉大熊猫栖息地植被图
4．四川卧龙–夹金山脉大熊猫栖息地世界自然遗产保护总体规划图
5．四川卧龙–夹金山脉大熊猫栖息地世界自然遗产保护分区规划图

1. 提名世界自然遗产地的重要性

1.1 提名地位置

提名的世界自然遗产地，四川大熊猫栖息地—卧龙·四姑娘山·夹金山脉（简称四川卧龙—夹金山脉大熊猫栖息地），位于中国四川省成都平原与青藏高原之间的邛崃山脉。它涉及四川省阿坝藏族羌族自治州、雅安市、成都市和甘孜藏族自治州的12个县市，覆盖该地区现有的7个自然保护区和9个风景名胜区。提名地的具体位置介于如下地理坐标之间：东经 102° 08′ 45″ ~ 103° 23′ 45″；北纬 29° 53′ 47″ ~31° 21′ 49″。提名地面积为 951 000 hm²，其中核心区 537 000 hm²，保护区 414 000 hm²。此外，还指定了提名地外围保护区，面积 529 000 hm²。

1.2 提名地独特的生物学特征

1.2.1 拥有大熊猫这一全球濒危物种保护的“旗舰物种”

大熊猫（*Ailuropoda melanoleuca*）是第三纪古热带森林动物的残遗种，具有典型食肉类动物的消化道组织结构，却以植物性食物为主，属高度特化的食肉目草食动物，独科单种，分类学上的地位特殊；大熊猫动物群的形成经历了第三纪热带环境、第四纪热带-亚热带环境和现代山地亚热带-亚高山寒温带环境的演化，是地球发展最新阶段—第四纪的地质-生物过程的突出例证，在哺乳动物分类与进化以及古环境变迁研究上，具有十分重要的科学价值。目前大熊猫仅产于中国四川省西部、甘肃省东南部和陕西省南部的局部区域，分布范围狭窄，被列为国家一级重点保护动物。同时，濒危野生动植物物种国际贸易组织（CITES）禁止大熊猫及其产品的国际贸易，世界自然保护联盟（IUCN）将大熊猫列为濒危物种。世界自然基金会（WWF）成立时（1961年），选定大熊猫为会徽，视之为国际野生动物保护的旗帜和全球自然保护的象征。

大熊猫的容貌奇异，举止天真，魅力神奇，深受各国人民尤其儿童的爱戴。无论中国政府的“国礼”，还是应邀出国展览，无不受到“国宾”式的礼遇。大熊猫是世界动物的“宠儿”。作为濒临灭绝的大型哺乳动物的大熊猫，不仅是中国的“国宝”，也是全世界人民共同的珍贵自然遗产。保护大熊猫遗产的关键是保护与保持大熊猫栖息地。因此，大熊猫栖息地的保护状况，受到国际社会的广泛关注。大熊猫栖息地保护，在全球环境与生物多样性保护上具有特殊意义。

20世纪80年代中期由中国林业部与WWF联合进行的全国第二次大熊猫调查的结果显示，在全国有大熊猫分布的34个县级政区中，四川省计28个县，占全国大熊猫分布县总数的82%；在全国大熊猫栖息地13 900 km²的总面积中，四川省计11 680 km²，占84%。全国大熊猫种群1 112 ± 240只中，陕西省有109 ± 23只，甘肃省有96 ± 21只，而四川省有907 ± 196只。四川省的大熊猫占全国大熊猫种群数量的82%。所以，四川省是全球大熊猫栖息地与大熊猫种群分布的主体。

提名地具有以下特点:

·大熊猫栖息地中具有最大种群、最广范围和最具完整代表性的残存部分

现存之大熊猫，自北而南分布于秦岭山脉、岷山山脉、邛崃山脉、相岭山脉、大雪山脉与大凉山脉。提名地包含了目前世界上还残存野生大熊猫的六大山脉中最重要的大熊猫栖息地，拥有数量最多的连续野生种群，是最大面积的大熊猫栖息地，以及适合大熊猫栖息的最大面积的潜在生境。与其他山脉相比，其破碎化程度较小，从海拔区带和竹子种类来讲，具有更多样的大熊猫栖息地类型，而且也比其他山脉保护得更好。胡锦矗教授认为，本区大熊猫的遗传多样性优于岷山山脉种群。

提名地覆盖邛崃山脉南段的主体，包括邛崃山脉主峰（四姑娘山）东坡的卧龙栖息地与北坡的毕棚沟栖息地、邛崃山脉南延主脉夹金山脉东-东南坡的夹金山脉栖息地与西坡的金汤河栖息地，邛崃山脉东南支脉大雪峰（西岭雪山）-青城山（赵公山）栖息地，以及联接各栖息地的高海拔分水岭地带。卧龙栖息地跨越岷江支流鱼子溪、郝江、草坡河的源区，夹金山脉栖息地跨越岷江干支流青衣江的支流宝兴河、天全河与芦山河的源区，毕棚沟栖息地属于岷江支流杂谷脑河下游右岸支沟的源区，金汤河栖息地属于大渡河支流金汤河的源区。大雪峰-青城山栖息地主体属于岷江支流文井江的源区。卧龙栖息地与夹金山脉栖息地是提名地大熊猫种群的主要分布区。整个提名地，处在横断山系东部的大渡河与岷江两大干流之间，构成南北长180千米、东西宽40～70千米的片状区域。目前提名地的大熊猫种群，约占全国野生大熊猫种群的三分之一。

提名地还是一大批珍稀野生动物的集中分布区。据调查估计，区内保有金丝猴(*Rhinopithecus roxellana*)约2 000只，扭角羚(*Budorcas taxicolor*)约1 800只，小熊猫(*Ailurus fulgens*)约200只，绿尾虹雉（*Lophopholus thuysii*）约150只。因此，提名地不仅是大熊猫的重要栖息地，也是金丝猴、扭角羚、小熊猫、绿尾虹雉等稀有濒危动物的重要栖息地。

·现有大熊猫圈养种群的主要种源

中国和海外动物园以及繁殖中心的大熊猫大部分来自这个山脉。据统计，自1955年起，先后从提名地调出野生活体大熊猫148只，包括夹金山脉栖息地的137只（其中：宝兴县118只，天全县14只，芦山县4只；大邑县1只）与卧龙栖息地11只（其中：汶川县9只，崇州市2只），供给北京、上海、天津、重庆与成都等22个国内的大型动物园和繁殖中心展出与研究，并通过国家礼品赠送、动物园之间展品交换和借展形式，向26国的50个国家动物园提供了展出与繁殖研究的活体。1957～1980年，从提名地选用的野生大熊猫18只（其中：宝兴县16只，天全县2只），由中国政府作为“国礼”赠予前苏联、朝鲜、美国、日本、法国、英国、前西德与墨西哥。此外，在同一时期，还从提名地调出金丝猴212只、扭角羚281只、绿尾虹雉50只、小熊猫41只，其它珍稀动物600只，供国内外展出与研究。因此，提名地为保护大熊猫的国际合作、社会教育与科学研究作出了特殊贡献。

·大熊猫和珙桐的模式标本产地以及科学探险和科学发现的独特地点

大熊猫第一次为科学界认识是在1869年。当年法国传教士戴维(Pere A. David)在宝兴县邓池沟捕捉了4只大熊猫，制成标本以后，在法国自然历史博物馆展出，并在博物馆通讯上发表了报告。戴维也是第一个于1871年采集到美丽的珙桐标本。为纪念戴维，H.E.Baillon用戴维的名字，将珙桐定名为*Davidia involucrata*。

提名地已经被证实为生物学探索的一个“宝库”。除发现象大熊猫和珙桐这样极其重要的物种外，戴维还发现了65种鸟类新种，以及大量植物、哺乳类和昆虫新种。其中很多是在提名地发现的。随后的探险不断地发现大量植物、两栖类和其它生物的新种。在提名地发现的物种种数（地模种）分别是：哺乳类32种、鸟类43种、鱼类和两栖类7种以及高等植物110种（统计不完全）。保护如此重要的模式标本产地具有极其重要的生物学意义。

1.2.2 许多子遗种与“活化石”物种的故乡

大熊猫和珙桐是自然演化长河中各自种群里最具代表性的物种，被称作“活化石”。“活化石”大熊猫又以古老的箭竹为食，以古老的冷、云杉为主的森林植被为栖息地，是多种物种协同进化的最佳例证。同时提名地也是随着青藏高原的隆起、海洋消失以及湿润的古地中海周围的广大森林干死后，在中国中部地区残留下来的大量活化石物种的故乡之一。

提名地是50～60个单型属（其中都江堰就有43个单型属）第三纪遗留下来的活化石的原产地，包括古老的独叶草（*Kingdonia uniflora*）、金钱槭（*Dipteronia sinensis*）、伯乐树（*Bretschneidera sinensis*）、连香树（*Cercidiphyllum japonicum*）、水青树（*Tetracentron sinensis*）等，甚至还有起源于三叠纪的“活化石”大卫两栖甲（*Amphizoa davidi*）。另外，银杏（*Ginkgo biloba*）可能被引入这个地区已经几个世纪了，水杉（*Metasequoia glyptostroboides*）也被大面积种植。

1.2.3 除热带地区以外全球有记录的植物物种最丰富的地区之一

提名地的植物种数超过5 000种，其中有花植物超过4 000种。该数值与法国的总植物物种数值相当。这里是温带，事实上是除热带雨林以外有记载植物物种最丰富的地区之一，是保护国际（Conservation International）认定的全球生物多样性热点地区之一，也是WWF确定的“全球200”生态区域之一。

这里植物物种丰富的原因是由于面积大、海拔范围宽和生态类型完整，以及该地区特殊的植物地理位置。而且该地区也是更新世冰期的生物避难所。在更新世由于气候干冷和湿热环境的不断变化，导致大多数物种的死亡，但是由于西部高原的屏障作用使这个地区气候即使在更新世最干旱的时期依然保持湿润。这种缓和作用如此剧烈，即使世界温度发生变化，植物也可以很容易地通过改变位置来适应剧烈变化的环境条件（WWF/MOF, 1989）。

提名地植物多样性的特点还有：

·植物区系成分十分复杂

以卧龙为例，根据中国科学院吴征镒院士提出的划分标准，世界分布、热带分布、温带分布、特有分布等类型均有存在。

卧龙自然保护区的植物区系成分

区系类型	全国		卧龙	
	属数	%	属数	%
1. 世界分布	103	3.7	29	4.61
2. 泛热带分布	373	13.3	82	13.06
3. 热带美洲和热带亚洲间断分布	89	3.2	19	3 03
4. 旧大陆热带分布	163	5.8	16	2.55
5. 热带亚洲至热带大洋洲分布	143	5.1	16	2.55
6. 热带亚洲至热带非洲分布	151	5.4	15	2.4
7. 热带亚洲（印度—马来西亚）分布	543	19.4	39	6.21
8. 北温带分布	296	10.6	186	29.62
9. 东亚和北美洲间断分布	117	4.2	48	7.64
10. 旧大陆温带分布	157	5.6	34	5.41
11. 温带亚洲分布	63	2.2	25	3.98
12 中亚分布	112	4.0	-	-
13. 东亚（东喜马拉雅—日本）分布	298	10.5	83	13.21
14. 中国特有分布	196	7.0	36	5.72
合计	2 804	100	628	100

• 多样性生态类型

提名地有大量各种不同的生态系统类型。以植物生态类型为例，仅卧龙就有5个植被型组、15个植被型、39个群系组和69个群系。

• 典型垂直自然带谱

提名地区最高峰四姑娘山海拔6250米，最低点都江堰（提名地边缘的外侧）海拔582米。在如此短的距离里高差达5668米。这导致了显著的垂直带谱，可以划分为7个生物垂直带。依次为：

600 ~ 1800 m　亚热带山地常绿阔叶林带

1800 ~ 2400 m　亚热带山地常绿阔叶与落叶阔叶混交林带

2400 ~ 2800 m　暖温带山地针阔混交林带。这是从秋季到春季大熊猫的重要活动地带。

2800 ~ 3800 m　寒温带亚高山针叶林带。这是夏季大熊猫重要的取食区域。

3800 ~ 4400 m　亚寒带高山灌丛草甸带

5000 m 以上　极高山永久冰雪带

• 具有世界上最丰富和繁茂的高山植物区系之一

植物学家(Wilson, 1916; Baron, 1987)认为提名地可能是世界上高山植物物种最丰富和最繁茂的范例。每个遗产地单元发现的不同物种的数量和种类的丰富程度令人惊异。在卧龙自然保护区的巴朗山，几平方米的范围内就可以发现数十种有花植物种类。四川夏季不同寻常的湿润云团使得气候与世界上其他高山地区形成了鲜明对比，那些高山地区干旱、光照强烈的夏季很典型。提名地为“华西雨屏”的中心位置，其潮湿的气候更有助于保护植物的多样性，使其成为更新世冰期的避难所，并有利于物种的特化。

• 濒危物种的重要保护区

提名地已发现国家重点保护植物67种。如下表所列：

提名地国家重点保护野生植物

序号	中　名	拉　丁　名	国家重点保护野生植物名录(1999)	中国珍稀濒危保护植物名录(1980)
1	光叶蕨	*Cystoathyrium chinensis*	1	2
2	银杏	*Ginkgo biloba*	1	2
3	红豆杉	*Taxus chinensis*	1	
4	南方红豆杉	*Taxus chinensis* var. *mairei*	1	
5	珙桐	*Davidia involucrata*	1	1
6	光叶珙桐	*Davidia involucrata* var. *vilmoriniana*	1	2
7	独叶草	*Kingdonia uniflora*	1	2
8	伯乐树	*Bretschneidera sinensis*	1	2
9	扇蕨	*Neocheiropteris palmatopedata*	2	
10	中国蕨	*Sinopteris grevilleoides*	2	2
11	金毛狗	*Cibotium barometz*		2
12	篦子三尖杉	*Cephalotaxus oliveri*	2	2
13	岷江柏木	*Cupressus chengiana*	2	2
14	四川红杉	*Larix mastersiana*	2	2
15	油麦吊云杉	*Picea brachytyla* var. *complanata*	2	
16	大果青扦	*Picea neoveitchii*	2	
17	巴山榧树	*Torreya fargesii*	2	
18	芒苞草	*Acanthochlamys bracteata*	2	
19	梓叶槭	*Aecr catalpifolium*	2	3
20	连香树	*Cercidiphyllum japonicum*	2	2
21	四川牡丹	*Paeonia szechuanica*		2
22	杜仲	*Eucommia ulmoides*		2
23	楠木	*Phoebe zhennan*	2	3
24	野大豆	*Glycine soja*	2	3
25	红豆树	*Ormosia hosiei*	2	
26	鹅掌楸	*Liriodendron chinense*	2	2
27	厚朴	*Magnolia officinalis*	2	3
28	园叶玉兰	*Magnolia sinensis*	2	3
29	西康玉兰	*Magnoila wilsonii*	2	3
30	峨嵋含笑	*Michelia wilsonii*	2	2
31	水青树	*Tetracentron sinense*	2	2
32	红椿	*Toona ciliata*	2	3
33	星叶草	*Circaeaster agrestis*		2
34	异颖草	*Anisachne gracilis*	2	
35	短芒披碱草	*Elymus brviaristatus*	2	
36	无芒披碱草	*Elymus submuticus*	2	
37	樟树	*Cinnamomum camphora*	2	
38	油樟	*Cinnamomum longepaniculatum*	2	
39	润楠	*Machilus nanmu*	2	
40	红花绿绒蒿	*Meconopsis punicea*	2	
41	羽叶点地梅	*Pomatosace filocula*	2	
42	香果树	*Emmenopterys henryi*	2	2
43	川黄檗	*Phellodendron chinense*	2	
44	崖白菜	*Triaenophora rupestris*	2	
45	山莨菪	*Anisodus tanguticus*	2	
46	紫椴	*Tilia amurensis*	2	
47	虫草	*Cordyceps sinensis*	2	
48	松口蘑(松茸)	*Tricholoma matsutake*	2	
49	桦榛	*Corylus chinensis*		3
50	白辛树	*Pterostyrax psilophyllus*		3
51	银叶桂	*Cinnamomum mairei*		3
52	延龄草	*Trillium tschonoskii*		3
53	羽叶丁香	*Syringa pinnatifolia*		3

续表

序号	中　名	拉　丁　名	国家重点保护野生植物名录(1999)	中国珍稀濒危保护植物名录(1980)
54	领春木	*Euptelea pleiospermum*		3
55	灰叶稠李	*Prunus grayana*		3
56	金钱槭	*Dipteronia sinensis*		3
57	筇竹	*Qiongzhuea tumidinosa*		3
58	桃儿七	*Sinopodophyllum emodi*		3
59	银鹊树	*Tapiscia sinensis*		3
60	黄连	*Coptis chinensis*		3
61	八角莲	*Dysosma versipellis*		3
62	天麻	*Gastrodia elata*		3
63	凹叶木兰	*Magnoila sargentiana*		3
64	麦吊云杉	*Picea brachytyla*		3
65	棕背杜鹃	*Rhododendron alutaceum*		3
66	大王杜鹃	*Rhododendron rex*		3
67	大叶柳	*Salix magnifica*		3

·除单种和稀有种的科属外，还有丰富的特有种属

提名地属于中国植物区系中三大特有种群中心之一的川西-滇西北中心的北段，特有属、种的数目较多。裸子植物的银杏属（*Ginkgo*）与杉木属（*Cunninghamia*），双子叶植物的金钱槭属（*Dipteronia*）、藤山柳属（*Clematoclethra*）、羌活属（*Notopterygium*）、毛冠菊属（*Nannoglottis*）、紫菊属（*Notoseris*）、华蟹甲草属（*Sinacalia*）、车前紫草属（*Sinojohnstonia*）、八角莲属（*Dysosma*）、伯乐树属（*Bretschneidera*）、珙桐属（*Davidia*）、岩匙属（*Berneuxia*）、杜仲属（*Eucommia*）、四轮香属（*Hanceola*）、异野芝麻属（*Heterolamium*）、动蕊花属（*Kinostemon*）、串果藤属（*Sinofranchetia*）、喜树属（*Camptotheca*）、星果树属（*Asteropyrum*）、铁破锣属（*Beesia*）、独叶草属（*Kingdonia*）、香果树属（*Emmenopterys*）、大血藤属（*Sargentodoxa*）、四福花（*Trtradoxa*）与崖白菜属（*Triaenophora*）等，单子叶植物的巴山竹属（*Bashania*）与筇竹属（*Qiongzhuea*）等，分布广泛。本地特有属数超过50属以上，约占全国特有属的20%。这种罕见的现象说明，本区生态非常有利于野生植物的生长和繁衍。

所列保护植物的多数是中国特有种。这些特有属、种的大多数起源古老，是系统进化中的独特植物。例如，原始类型的有独叶草属、杜仲属、八角莲属与梓叶槭、园叶玉兰、西康玉兰、峨嵋含笑（*Michelia wilsonii*）、棕背杜鹃（*Rhododendron fiitolacteam*）等；单型、寡型的有银杏属、珙桐属、金钱槭属、伯乐属、连香树属等，发生于第三纪甚至侏罗纪或更早的地质时期。银杏类始现于晚古生代，中生代的侏罗纪发展最盛，白垩纪晚期突然衰退，现仅存1属1种，在提名地的二郎山有较大面积的分布，也可能是很久以前引入的。珙桐类始现于第三纪，在第四纪中期曾广布于世界各地，现仅存1属1种1变种，在提名地有大面积的自然分布。提名地是以珙桐、银杏为代表的中国特有孑遗种的集中分布区，象珙桐、伯乐树、连香树、香果树等还是第三纪古热带植物区系的重要组成部分。

提名地已发现76个稀有种属，如金钱槭、领春木（*Euptelea*）和动蕊花；36个单种属，如香果树（*Emmeopterys*）、串果藤和独丽花（*Moneses*）；15个特有单种属，如珙桐、水青树，占总特有种属数的41.67%。另外，还有22个特有兰科种，如黄花白芨（*Bletilla ochracea*）、短距虾脊兰（*Calanthe arcuata*）和长矩玉讽花（*Habenaria davidii*），占提名地兰科种属的38.6%；杜鹃特有种6种。此外，还有14个特有裸子植物种属。

· 杜鹃多样性中心

区内有95种杜鹃，比以杜鹃多样性闻名的东喜马拉雅地区的尼泊尔和不丹的种类总和还要多，是中国和全球的杜鹃多样性中心之一。其中包括被《中国植物红皮书》列为渐危种的国家3级重点保护的棕背杜鹃与大王杜鹃（*Rh. rex*）以及提名地特有种卧龙杜鹃（*Rh. wolongnesis*）等6种。杜鹃花属中最原始的类群云锦杜鹃（*Rh. fortunei*）亚组有12种分布于本区，占该亚种的50%。

· 中国中部具有从永久性冰川到亚热带常绿森林连续分布的两个地点之一

中国中部地区有两个完整的垂直自然带谱，从永久性冰川，再通过高山植物、亚高山植物、山地混交林，再往下为亚热带常绿阔叶林。一个为提名地，另一个是四川西部的贡嘎山。

· 中医药的重要基因库之一

提名地是中国传统药用植物的重要来源和基因库。已知的当地药用植物有几百种，其中许多是稀有濒危物种，如天麻、贝母、龙胆和虫草。由于它们潜在的药用研究价值，这些物种的保护对于这类重要自然资源的保护以及中医药文化都有着重要的意义。

· 西方园林的主要种子基地

英国著名植物学家威尔逊在英国园艺家协会的资助下曾将30吨植物种子带回英国，多数产自提名地。他的《一个博物学家在中国西部》精彩地描述了他的经历。那些植物极大改变了欧洲的园艺发展，实际上今天许多所谓经典的“英式”景观园林的植物是来自中国的。其中包括很多装饰灌木，如杜鹃、木兰、连翘（*Forsythia*）、碎鱼草（*Buddleia*）、枸子（*Cotoneaster*）、小檗（*Berberis*）、竹子，蕨类和大量花卉，如百合、红牡丹、兰花、樱花、樱粟、杜鹃、紫苑和银莲花。1929年，威尔逊在车祸逝世前不久写了一本题名《中国，园林之母》的书。

1.2.4 丰富的野生动物多样性和动物保护的优先地区

提名地区已知的野生动物，有脊椎动物542种和昆虫1 700种。在脊椎动物中，有兽类猴科、熊科、小熊猫科、大熊猫科等25科109种（或亚种），占四川兽类的50%和全国兽类的20.5%；鸟类鹰科、隼科、雉科、鹤科等45科365种（或亚种），占四川鸟类的68%；爬行类蛇蜥科、游蛇科等9科32种（或亚种）；两栖类小鲵科、树蛙科等8科22种（或亚种）和鱼类鮡科、鲑科等5科14种。提名地是中国野生脊椎动物的集中分布区。在昆虫中，有蜉蝣目3种、蜻蜓目5种、蜚蠊目1种、螳螂目1种、襀翅目1种、竹节目2种、直翅目17种、革翅目3种、同翅目23种、半翅目52种、鞘翅目181种、广翅目1种、脉翅目3种、毛翅目4种、翅鳞目731种、双翅目33种、和膜翅目27种。

· 区系成分

在动物区系上，提名地处于东洋界与古北界交汇的中印亚界，属横断山系东缘山地亚热带森林动物群向川西山原针叶林、灌丛草甸青藏高原动物群过渡。以兽类为例，东洋界代表性科有特有科—大熊猫科、旧大陆热带－亚热带特有科—竹鼠与灵猫科、环球热带－亚热带的菊头蝠科等，全北界代表性科有特有科—林跳鼠科、鼠兔科等。

· 垂直分带

提名地动物种群的垂直分带比较明显，海拔1000～2200 m的常绿阔叶林、常绿阔叶与落叶阔叶混交林以南中国和东南亚热带－亚热带动物为主，代表种如斑腿泛树蛙（*Polypedates*

megacephalys)、水鹿（*Muntiacus reevesi*）等；海拔2200～3600 m的针阔叶混交林与针叶林，以横断山-喜马拉雅山动物为主，代表种以血雉（*Ithaginis cruentus geoffroyi*）、金丝猴（*Rhinopithecus roxellana*）、大熊猫（*Ailuropoda melanoleuca*）、小熊猫（*Ailurus fulgeus*）等中国或四川特有种为多；海拔3600 m以上的灌丛草甸与流石滩植被，以山原动物为主，代表种有雪鹑（*Lerwa lerwa major*）、绿尾虹雉（*Lophophorus thuysii*）、岩羊（*Pseudois nayaur*）等。

·濒危物种

已发现的86种重点保护野生动物中，属于国家一级保护的有大熊猫、绿尾虹雉、金带喙凤蝶（*Teinopapus imperialis*）等16种；属于国家二级保护的有小熊猫、秃鹫（*Aegypius monachus*），三尾褐凤蝶（*Bhutanitis*）和阿波罗绢蝶（*Parnassius apollo*）等62种；四川省重点保护动物赤狐（*Vulpes vulpes*）等8种。因此，提名地是中国稀濒野生脊椎动物和蝶类的集中分布区。

·特有种

提名地的中国、四川特有种，兽类有大熊猫、金丝猴、白唇鹿（*Cervus albirostris*）等，鸟类有绿尾虹雉、宝兴歌鸫（*Turdus mupinensis*）、宝兴鹛雀（*Moupinis poecilotis*）等，两栖类有宝兴齿蟾（*Oreolalax popei*）、四川湍蛙（*Staurois mantzorum*）、宝兴泛树蛙（*Polypedates dugritei*）等，鱼类有宝兴裸裂尻鱼（*Schizopygopsis malacanthus baoxingensis*）、重口裂腹鱼（*Schizothorax davidi*）、川陕哲罗鲑（*Hache beekeri*）等，爬行类的半数为特有种，有四川龙蜥（*Japalura szechwanensis*）、美姑脊蛇（*Achalinus meiguensis*）等；昆虫类大卫两栖甲是提名地特有种。

提名地重点保护野生动物

序　号	中　名	拉　丁　名	保护等级		
			中国保护	CITES	IUCN
1	金丝猴	*Rhinopithecus roxellana*	1	附录 I	VU
2	大熊猫	*Ailuropoda melanoleuca*	1	附录 I	EN
3	雪豹	*Panthera uncia*	1	附录 I	EN
4	豹	*Panthera pardus*	1	附录 I	
5	云豹	*Neofelis nebulosa*	1	附录 I	VU
6	白唇鹿	*Cervus albirostris*	1		VU
7	扭角羚	*Budorcas taxicolor*	1	附录II	R
8	黑鹳	*Ciconia nigra*	1	附录II	
9	玉带海鵰	*Haliaeetus leucoryphus*	1	附录II	R
10	白尾海鵰	*Haliaeetus albicilla*	1	附录 I	VU
11	金鵰	*Aquila chrysaetos*	1	附录II	
12	胡兀鹫	*Gypaetus barbatus*	1	附录II	
13	斑尾榛鸡	*Tetrastes sewerzowi*	1		
14	雉鹑	*Tetraophasis obscurus*	1		
15	绿尾虹雉	*Lophophorus thuysii*	1	附录 I	EN
16	黑颈鹤	*Grus nigricollis*	1	附录 I	VU
17	猕猴	*Macaca mulatta*	2	附录II	
18	藏酋猴	*Macaca thibetana*	2	附录II	
19	豺	*Cuon alpinus*	2	附录II	VU
20	马熊	*Ursus actos pruinosus*	2	附录 I	
21	黑熊	*Selenarctos thibetanus*	2	附录 I	VU
22	小熊猫	*Ailurus fulgens*	2	附录II	EN
23	石貂	*Martes foina*	2	附录III	

续表

序号	中名	拉丁名	保护级别		
			中国保护	CITES	IUCN
24	黄喉貂	*Martes flavigula*	2	附录III	
25	水獭	*Lutra lutra*	2	附录 I	
26	大灵猫	*Viverra zibetha*	2	附录III	
27	小灵猫	*Viverricula indica*	2	附录III	
28	斑灵狸	*Prionodon pardicolor*	2	附录 I	
29	金猫	*Felis temmincki*	2	附录 I	
30	兔狲	*Felis manul*	2	附录II	
31	猞猁	*Lynx lynx*	2	附录II	
32	林麝	*Moschus berezovskii*	2	附录II	
33	马麝	*Moschus sifanicus*	2	附录II	
34	马鹿	*Cervus elaphus*	2		
35	白臀鹿	*Cervus elaphus macneilli*	2		
36	水鹿	*Cervus unicolor*	2		
37	藏原羚	*Procapra picticaudata*	2		
38	鬣羚	*Capricornis sumatraensis*	2	附录 I	VU
39	斑羚	*Naemorhedus goral*	2	附录 I	VU
40	盘羊	*Ovis ammon*	2	附录II	VU
41	岩羊	*Pseudois nayaur*	2		
42	鸳鸯	*Aix galericulata*	2		
43	普通鵟	*Buteo buteo*	2		
44	鸢	*Milvus korschun*	2		
45	苍鹰	*Accipiter gentilis*	2		
46	雀鹰	*Accipiter nisus*	2		
47	松雀鹰	*Accipiter virgatus*	2		
48	秃鹫	*Aegypius monachus*	2	附录II	VU
49	乌雕	*Aquila clanga*	2	附录II	
50	灰背隼	*Falco columbarius*	2		
51	红隼	*Falco tinnunculus*	2	附录II	
52	红脚隼	*Falco vespertinus*	2		
53	雪鹑	*Lerwa lerwa*	2		
54	血雉	*Ithaginis cruentus*	2		
55	红腹角雉	*Tragopan temminckii*	2		
56	藏马鸡	*Crossoptilon harmani*	2	附录 I	
57	白马鸡	*Crossoptilon crossoptilon*	2	附录 I	VU
58	蓝马鸡	*Crossoptilon auritum*	2		
59	勺鸡	*Pucrasia macrolopha*	2		
60	红腹锦鸡	*Chrysolophus pictus*	2		
61	白腹锦鸡	*Chrysolophus amherstiae*	2		
62	灰鹤	*Grus grus*	2		
63	楔尾绿鸠	*Treron sphenura*	2		
64	大腹胸鹦鹉	*Psittacula derbiana*	2		
65	领角鸮	*Otus bakkamoena*	2		
66	鹰鸮	*Bubo bubo*	2	附录II	
67	林鹰鸮	*Bubo nipalensis*	2	附录II	
68	纵纹腹小鸮	*Athene noctua*	2		
69	灰林鸮	*Strix aluco*	2		
70	长尾林鸮	*Strix uralensis*	2		
71	斑头鸺鹠	*Glaucidium cuculoides*	2		
72	领鸺鹠	*Glaucidium brodiei*	2		
73	大鲵	*Andrias davidianus*	2	附录 I	
74	川陕哲罗鲑	*Hucho bleekeri*	2		
75	拉步甲	*Carabus lafossei*	2		
76	彩臂金龟	*Cheirotonus gestroi*	2		

续表

序号	中名	拉丁名	保护级别		
			中国保护	CITES	IUCN
77	三尾褐凤蝶	*Bhutanitis thaidina dongchuanensis*	2		
78	阿波罗绢蝶	*Parnassius apollo*	2		R
79	赤狐	*Vulpes vulpes*	3		
80	香鼬	*Mustela altaica*	3	附录III	
81	豹猫	*Felis bengalensis*	3	附录 I	
82	毛冠鹿	*Elaphodus cephalophus*	3		
83	大鼯鼠	*Petaurista petaurista*	3		
84	普通夜鹰	*Caprimulgaus indicus jataka*	3		
85	鹰鹃	*Cuculus sparverioides*	3		
86	白喉针尾雨燕	*Hirundapus caudacutus*	3		

注：中国保护1级、2级为国家重点保护，3级为四川省重点保护。
CITES濒危物种国际贸易公约组织1995年。
IUCN国际自然与自然资源保护同盟1994年：EN 濒危种；VU 渐危种；R 稀有种。

·某些特有鸟类如雉类的分布中心

ICBP（现称鸟类国际）通过对留鸟的全球分布分析，确定了30个特有鸟区（EBA），也就是若干鸟区相互重叠的地区。中国有13个特有鸟区，其中2个在提名地内，包含了大多数濒危的中国特有鸟。

提名地是某些特有鸟类的分布中心，如柳莺（*Phylloscopus*）、噪鹛（*Garrulax*）、朱雀（*Corpodacus*）和雉类。中国是公认的全球雉类多样性中心，有63个种。提名地包含了16个种，比已知的任何其他单独的地区都多。

·中国最重要的哺乳类保护地区

对于哺乳类的保护，中国最重要的地区从青藏高原东缘森林带，通过四川西部到陕西南部和湖北西南部地区。这是中国许多珍贵和濒危动物的故乡；包括大熊猫、小熊猫、扭角羚、林麝、金丝猴和许多其它物种（MacKinnon et al, 1994）。在这个地带中，提名地是这些重要哺乳类最具代表性的地点。用已知的县级物种分布或生物地理区划聚类分析（Xie Yan, 2001, 2002）也证实了该地的重要性，并指出了汶川、宝兴、康定、天全、泸定、理县等县的重要性所在。

1.2.5 重要的生态服务功能

由于提名地位于长江上游，这些地区森林生态系统的改善对中国的经济有极其重要的作用。大约四分之一的中国人口居住在长江下游流域，或者依赖于流经三峡的水和产生的电力。因而大约3亿人民的生活受到流域成功或失败的影响。良好的保护意味着更可靠的水源、更好的电能供给、更好的防洪和更好的水利交通。保护不好则意味着更频繁、更严重的洪灾、水源短缺、水渠和灌溉系统淤积断流，以及内陆渔业的损失等。

在更具体的地方范围内，位于世界遗产地区域内的山地将得到更大强度的生态旅游基础设施和保护管理投资，而且将增加当地老百姓的收入。他们的支持和合作对规划的成功与否十分重要。

1.3 具有40年开创性研究和保护活动的历史

20世纪60年代，四川省人民政府即开始这个地区的大熊猫研究。位于海拔2400米的著名

的大熊猫研究站五一棚建立于1979年。从那时起，这里就一直进行研究，是对大熊猫持续研究时间最长的山地系统研究站之一。

研究包括运用无线电遥感技术开展的大熊猫、小熊猫和黑熊的破碎地带研究，长期对亚高山竹子的监测，森林砍伐后森林连续性和恢复的补充研究，以及对其它植物和动物的研究。

核桃坪中国保护大熊猫研究中心开展的大熊猫繁育实验研究进一步补充了五一棚的研究工作。该中心建立于1983年，其研究工作建立在远程感知和GIS技术支持的基础上。

卧龙和喇叭河自然保护区成立于1963年，是中国首批成立的自然保护区。除广东鼎湖山人与生物圈保护区（建立于1956年）外，在中国，提名地具有最长的保护活动历史和最丰富的保护区管理经验。

1.4 世界上最大和最成功的大熊猫圈养繁殖中心

卧龙核桃坪中国保护大熊猫研究中心是世界上最大和最成功的大熊猫圈养繁殖中心。这里有最大的圈养大熊猫种群数量，有最大的成功圈养出生数量。该中心的突出特点是它座落在该物种的自然栖息地，有很大的自然封闭区（2 hm^2），动物可以进行比其他任何圈养站更自然的生命活动。

1.5 引人入胜的风景名胜区

提名地的自然风光有着森林覆盖的陡峭山谷、清澈的急流、多岩石的峭壁、广阔的高山草甸和四姑娘山的高耸冰川顶峰。还有奇异的淡水湖、壮丽的冰川风光。风景随季节而不断变化—冬季的冰柱和覆雪的地面，春季遍野的鲜花，夏季丰富的高山色彩，秋季绚丽的红叶以及全年繁茂的竹子。变幻的云雾环绕在峭壁或山谷。

已经确定了20多个风景区，其中每一个都有其独特的特点：

卧龙自然保护区银厂沟　云雾环抱山峰，幽谷深处古木参天，水流湍急。大熊猫为景区带来了更多情趣；

卧龙核桃坪中国保护大熊猫研究中心　设6个实验室，圈养48只大熊猫，是研究大熊猫的理想场所。游客可以看到圈养和户外活动的大熊猫；

卧龙自然保护区三江景区　以珙桐森林和水鹿等野生动物出没的亚高山湖泊景观著名，森林茂盛，景色奇秀；

四姑娘山风景名胜区长坪沟景区　千年古柏遮天蔽日，山风吹过，暗香涌动；落叶松林秋色金辉；

四姑娘山风景名胜区双桥沟景区　奇异的亚高山沙棘森林与群峰峭崖的组合，冰雪覆盖的群峰；

四姑娘山风景名胜区海子沟景区　冰蚀湖－亚高山草甸，湖上鱼与鹰上下翱翔，湖滨繁花似锦，四姑娘山主峰；

米亚罗风景名胜区红叶景区　长127km，面积300 000 hm^2，海拔1700~3400 m，317国道横贯其间。金秋10月，万山红遍，是国内最大的红叶景区；

米亚罗风景名胜区毕棚沟景区　大熊猫生境、原始森林－野生动物、冰川雪山景观，融

高山草原、湖泊与峡谷风光于一体；

草坡自然保护区　大熊猫生境、原始森林－野生动物景观，水色清秀，瀑布众多；

蜂桶寨自然保护区　大熊猫生境、原始森林－野生动物景观，大熊猫与金丝猴密度较高，四季景色秀丽，建有大熊猫等十余种稀濒动物的圈养场；

夹金山风景名胜区夹金山景区　大熊猫生境、雪山、藏寨与藏族风情、红军长征徒步翻越大雪山纪念地景观；

夹金山风景名胜区扑鸡沟景区　大熊猫生境、原始森林－野生动物、雪山景观，春夏秋冬景色具佳；

夹金山风景名胜区赶羊沟景区　大熊猫生境、野桂花原始森林－野生动物、峡谷景观，野桂花林面积约600 hm^2，极其罕见。

夹金山风景名胜区邓池沟清代天主教堂　建于1839年，建筑面积1 560 m^2，中式四合院布局，法式教堂装饰，因法国自然史学家P.A. 戴维担任神甫期间，于1869年发现大熊猫而闻名于世。整个建筑保存完好，是宝兴县天主教的活动场所。

喇叭河自然保护区　大熊猫生境、原始森林－野生动物、雪山景观，扭角羚群、鹿群、猴群密度较高，可以直接观赏动物的野外活动；

二郎山风景名胜区白沙河景区　大熊猫生境、原始森林－野生动物景观，融峡谷与品种繁多的杜鹃群丛于一体；

二郎山风景名胜区二郎山景区　大熊猫生境、原始森林－野生动物、雪山景观，长20千米的珙桐优势森林长廊与数百公顷的银杏优势森林十分罕见；

灵鹫山–大雪峰风景名胜区大雪峰景区　大熊猫生境、原始森林－野生动物、雪山冰川景观，大熊猫、鹿群、扭角羚群密度较高，杜鹃花与冬景极佳；

青城山–都江堰风景名胜区青城山景区　大熊猫生境、原始森林－野生动物景观，天师洞等道教文化遗存已列为世界文化遗产；

西岭雪山风景名胜区后山景区　大熊猫生境、原始森林－野生动物景观、雪山景观，以森林“佛光”、红叶秋景与雪景闻名；

鸡冠山–九龙沟风景名胜区鸡冠山景区　大熊猫生境、原始森林－野生动物景观，有罕见的溪谷瀑布群、奇异的峰崖、雄旷的亚高山草甸；

天台山风景名胜区　大熊猫生境、丹霞地貌景观，竹林茂盛，景色秀丽；

金汤–孔玉自然保护区　大熊猫生境、原始森林－野生动物、亚高山草甸景观，有古代川藏茶马故道和红军长征遗迹。

1.6 具有藏、羌民族文化、汉族寺庙、道教和清代天主教的历史遗迹

提名地的东北入口是都江堰市，以庙宇和水利工程著称。青城山是著名的道教胜地。这里已经单独被认为是著名的文化遗址，已被列入世界文化遗产地。

宝兴和芦山还有其他的汉文化遗址，在提名地及其周围有早期居住人类地，也发现了2000多年前的汉代文化遗址。位于宝兴邓池沟的法式天主教堂完整地保存了独特的中西融合的文化形式。

羌和藏民族以独特的建筑、服饰、语言、舞蹈、宗教和其他文化传统保存了其文化价值。

2. 遗产地保护现状及面临的问题

2.1 保护现状

提名地中的卧龙和喇叭河自然保护区建于六十年代。之后区内又陆续建立了5个自然保护区(另2个自然保护区位于风景名胜区内)和9个风景名胜区，依照相应的保护管理条例，如“中华人民共和国自然保护区管理条例”和国务院“风景名胜区管理暂行条例”等进行管理。20世纪80年代中期以来，国家和四川省都颁布了野生动物保护法规，对稀濒野生动物实行了保护，并在许多县实施了禁猎。

1979年以来，四川省开展了广泛的国际合作，在提名地开展有关大熊猫和其他野生动植物的研究以及保护项目，其中历时最长的是与WWF进行的有关大熊猫研究和保护的合作，在全面调查基础上编制了《中国大熊猫及栖息地保护计划》(1989)，并进一步发展成为《中国保护大熊猫及其栖息地工程》，于1993年经国务院批准实施。

自1999年全国天然林保护工程实施以来，四川全省实施了天然林禁伐，消除了对栖息地最主要的威胁。2000年以来，按照国家的战略要求，四川省又实施了退耕还林工程。天然林保护和退耕还林两项工程为恢复遭到破坏的大熊猫栖息地和生物多样性提供了极大的可能性。自2001年起，国家林业局开始实施全国野生动物保护和自然保护区工程，加大了对提名地内大熊猫、金丝猴等主要濒危物种的保护力度和资金投入，并将进一步扩大自然保护区的范围，提高现有保护区的有效性。现将提名地中各自然保护区和风景名胜区的情况简略介绍如下：

卧龙自然保护区 1963年建于汶川县境，主要保护大熊猫与金丝猴，为国家级自然保护区，设保护区管理局，已完成总体规划与主要基础设施建设，面积200 000 hm²，全部进入提名地。现有野生大熊猫约100只，是《中国大熊猫及其栖息地管理计划》与《中国保护大熊猫及其栖息地工程》项目的重点实验区。2000年旅游流量6万人次。

喇叭河自然保护区 1963年建于天全县境，主要保护扭角羚与大熊猫，为省级自然保护区，设保护区管理处，已完成总体规划和部分建设，面积23 400 hm²，全部进入提名地。现有大熊猫约12只，实施了《天然林保护工程》和《退耕还林工程》。2000年旅游流量0.3万人次。

蜂桶寨自然保护区 1975年建于宝兴县境，主要保护大熊猫，为国家级自然保护区，设保护区管理局，已完成总体规划和部分建设，面积39 000 hm²，全部进入提名地。现有大熊猫约40只，实施了《中国大熊猫及其栖息地管理计划》与《中国保护大熊猫及其栖息地工程》。2000年旅游流量0.6万人次。

青城山-都江堰风景名胜区 1982年建于都江堰市境，保护青城山道教文化遗存与景观生态系统、都江堰古代水利工程，为国家重点风景名胜区，设风景区管理局，已完成总体规划与建设，面积15 000 hm²。其青城山景区现有大熊猫约6~8只，进入提名地，实施了《天然林保护工程》和《退耕还林工程》。2000年旅游流量40万人次。

鸡冠山-九龙沟风景名胜区 1986年建于崇州市境，为省级风景名胜区（含鞍子河省级自然保护区)，设风景区管理局，已完成总体规划与部分建设，面积39 400 hm²，大部分进入提名地。现有大熊猫约15只，实施了《天然林保护工程》和《退耕还林工程》。2000年旅游流量8万人次。

天台山风景名胜区 1989年建于邛崃市境，保护景观生态系统，为省级风景名胜区，设风景区管理局，已完成总体规划与部分建设，面积21 000 hm²，全部进入提名地外围保护区。现有大熊猫4～6只，实施了《天然林保护工程》和《退耕还林工程》。

黑水河自然保护区 1993年建于芦山与大邑县境，主要保护大熊猫，为省级自然保护区，由两县林业局共同管理，尚未规划与建设，面积31 800 hm²，全部进入提名地。现有大熊猫约25只，实施了《天然林保护工程》和《退耕还林工程》。

四姑娘山风景名胜区 1994年建于小金县境，保护景观生态系统，为国家重点风景名胜区，设风景区管理局，已完成总体规划和部分建设，面积45 000 hm²，全部进入提名地。70年代有大熊猫分布，是雪豹、绿尾虹雉等的集中分布区，实施了《天然林保护工程》和《退耕还林工程》。2000年旅游流量6.4万人次。

西岭雪山风景名胜区 1994年建于大邑县境，为国家重点风景名胜区，设风景区管理局，已完成总体规划与基本建设，面积48 300 hm²。尚未开发的后山景区进入提名地。现有大熊猫约20只，实施了《天然林保护工程》和《退耕还林工程》。

夹金山风景名胜区 1995年建于宝兴县境内，保护大熊猫景观生态系统，为省级风景名胜区，由县建设环保旅游局管理，已完成总体规划，尚未建设，面积127 500 hm²，绝大部分进入提名地。现有大熊猫约100只，实施了《天然林保护工程》和《退耕还林工程》。

米亚罗风景名胜区 1995年建于理县境，保护景观生态系统，为省级风景名胜区（含米亚罗省级自然保护区），设风景区管理局，已完成总体规划与部分建设，面积368 800 hm²。2000年在毕棚沟景区发现大熊猫2只，毕棚沟景区与红叶景区的部分进入提名地，实施了《天然林保护工程》和《退耕还林工程》。

金汤-孔玉自然保护区 1995年建于康定县境，保护野生动物与生态系统，为省级自然保护区，由县林业局管理，已完成总体规划，尚未建设，面积120 000 hm²，大部进入提名地。现有大熊猫约10只，实施了《天然林保护工程》和《退耕还林工程》。

四姑娘山自然保护区 1996年建于小金县境，保护生态系统，为国家级自然保护区，设保护区管理局，已完成总体规划与部分建设，面积130 000 hm²，部分进入提名地。70年代有大熊猫分布，是雪豹、绿尾虹雉等的分布区，实施了《天然林保护工程》和《退耕还林工程》。

灵鹫山-大雪峰风景名胜区 1999年建于芦山县境内，保护景观生态系统，为省级风景名胜区，由县建设局管理，尚未规划与建设，面积30 000 hm²。其大雪峰景区有大熊猫约25只，进入提名地，实施了《天然林保护工程》和《退耕还林工程》。

二郎山风景名胜区 2000年建于天全县境内，保护景观生态系统，为省级风景名胜区，由县建设环保旅游局管理，尚未规划与建设，面积126 000 hm²，核心景区进入提名地。现有大熊猫约23只，实施了《天然林保护工程》和《退耕还林工程》。

草坡自然保护区 2000年建于汶川县境，保护大熊猫，为省级自然保护区，设保护区管理局，尚未规划与建设，面积55 678 hm²，大部分进入提名地。现有大熊猫约10只，实施了《天然林保护工程》和《退耕还林工程》。

2.2 社会经济简况

提名地所涉及的阿坝藏族羌族自治州、雅安市、成都市和甘孜州藏族自治州的12个县，2000年的总人口为313万人。提名地处在各县辖区的边缘区域，是藏族、羌族、回族、彝族等少数民族的聚居区。提名地范围内2000年人口为21 320人，在核心区有居民260户、1 020人，保护区有居民20 300人。主要包括汶川县卧龙乡全乡与耿达乡的一部分4 900人，小金县日隆乡的一部分500人，宝兴县硗碛乡全乡5 030人与永富乡的大部分1 200人，芦山县的太平、中林、大川镇（乡）的一部分650人，天全县的小河乡、两路乡的一部分180人，都江堰市的泰安乡、青城山镇的一部分700人。

提名地人口中少数民族约占60%。

提名地区目前的人均国内生产总值和农村居民纯收入水平（四川省统计局，2001）如下:

	2000年人均国内生产总值（人均GDP）	2000年农村居民人均纯收入
成都市	13 020元	2 926元
雅安市	4 949元	1 909元
阿坝州	4 288元	1 191元
甘孜州	2 797元	733元

上面的数据是包含城市和工业在内的大区域的平均值，处在政区边缘的提名地的实际经济水平则要低得多。以上数据表明，提名地内群众的生活仍然非常贫困尤其是地处偏远的阿坝州和甘孜州。

2.3 面临的环境压力和威胁

2.3.1 旅游发展

目前，除青城山景区的前山世界文化遗产景区达到40万人次/年的客流量和卧龙自然保护区的6万人次/年外，提名地内其它风景区和自然保护区的游客量很小。预计提名地被正式列入世界自然遗产名录后，旅游流量会有较大的增长。在天然林保护工程实施停伐后，许多地方的财政和社区群众收入明显下降，寻找替代经济来源的压力很大。地方政府和群众往往对发展旅游寄予很大的期望。但是已经开发旅游的一些地方普遍出现了游客人数猛增，旅馆、道路等设施的建设无序或对环境带来直接的破坏，游客带来的垃圾和污水管理不善等等一系列问题对环境和野生动物直接的负面影响。卧龙自然保护区核桃坪旅馆餐馆等设施的建设曾经出现缺乏规划的问题，巴郎山植被遭游人踩踏、摘采等。目前卧龙正在大力整顿区内旅游的管理，对设施建设进行规范。旅游的规范管理将是遗产地保护管理的一项主要任务。

2.3.2 偷猎

提名地内和周边生活的一些当地农民有时偷猎，设置陷阱捕捉经济价值高的动物如麝，但是这些陷阱也常常杀死毛冠鹿、鹿，偶尔也误伤黑熊和大熊猫。杀死大熊猫的人总是把兽皮藏

起来，寻找收购珍品的买主。进行这种皮货贸易的案件仍有发生，但在90年代以后大大下降。对捕杀或贸易国家保护野生动物的判刑是极其严格的，猎杀大熊猫和贩卖大熊猫皮的罪犯常常被判处重刑。

然而消灭偷猎现象除了严格的法律，还需要制定规划来捣毁陷阱，加强森林巡护，增加和地方社区的交流，引导他们开展对环境影响较小的生产生活活动。

2.3.3 采矿活动

提名地及外围保护区有一些采石场、多种金属矿场、煤矿和化工原料矿场。这些矿场设备简陋，技术粗糙，给一些地区的森林植被和环境带来了严重破坏。宝兴县有3个较大规模的大理石采石场，采矿活动产生了水、噪音和灰尘污染，以及破坏植被层和废物遗弃等问题。

2.3.4 冶炼化工污染

近年在大熊猫栖息地入口处附近兴建了多处冶炼厂、硫酸厂，工艺落后，规模虽小而对大气、水体与土壤的污染明显，对大熊猫的生存环境构成威胁。

2.3.5 人口增长

提名地是中国少数民族聚居区，居民以藏族、羌族为主。卧龙保护区1975年有421户2 560人，而1995年则增长到904户4 260人。处在夹金山脉腹地的宝兴县硗碛乡，1957年为3 000人，2000年增长到5 030人。人口的增长使当地居民对自然资源的需求也随之增加。

2.3.6 垦荒与过度放牧

由于人口的增长，农耕从谷地向谷坡发展，一些大熊猫栖息地的边缘地带渐被开垦，栖息地内的农耕地与牧场形成的天窗亦日渐扩大，导致大熊猫活动的下限海拔上升和活动范围进一步缩小。此外，提名地的高山草甸广泛用于放牧。在卧龙自然保护区的高山草甸上尤其明显。一些地区一直存在过度放牧和高山草场退化现象。一定量家养动物的放牧可能对维持天然植被状况是必须的。遗产管理的主要任务是要确保放牧水平稳定在这些区域的自然承载能力范围内。

2.3.7 森林采伐

邛崃山脉的森林资源丰富，是成都平原木材的长期供应地。其东坡山麓地带的森林早已采伐殆尽，最近40年的采伐推进到亚高山地带。主要支流都经过一定程度采伐，导致大熊猫栖息地被分割。森林砍伐曾经是提名地内对栖息地的最主要威胁，这种状况直至1999年四川省人民政府决定全面停止天然林砍伐和国家实施天然林保护工程，才得以根本扭转。

2.3.8 药用植物的采集

采集药用植物对某些珍稀物种的生存是一种威胁。此外，采集者在保护区内的活动，特别是在带有猎狗的情况下，会对害羞的大熊猫和幼仔造成极为严重的干扰，迫使它们放弃适宜的生态环境。

2.3.9 引种外来植物

主管部门提倡并鼓励在提名地内的退化地区植树造林，但同时必须严格控制和规范以确保所种物种是合适的本地物种。少数地区引种非本地物种，包括日本落叶松、松树（*Pinus*）、柳杉（*Gyptomeria*）以及其他一些树种、灌木和花卉植物。应该在提名地内停止外来种引种，以避免外来物种（包括国内其他地区的物种）可能通过外来入侵种扩散的形式给本地动植物区系带来威胁。为了满足种植的需要，建立足够的乡土种子苗圃是十分必要的。

2.3.10 基础设施的建设

从卧龙自然保护区到阿坝藏族自治州和成都的公路横穿提名地。这是一条比较繁忙的客货运输线，给路边植物和野生动物带来了一定影响。为了降低影响程度，将在每年大熊猫发情交配期的3月～6月，实行夜间（每天17时～次日7时）关闭公路。

提名地内还有输电线路、水渠和多个水电站。这些可以作为基础设施，适当地使用和维护。遗产主管部门应该确保所有在遗产地内建设必要基础设施的设计和管理尽可能少地影响自然环境，任何不必要的、对环境有较大影响的设施必须禁止建设或予以拆除。

2.3.11 关于捕捉大熊猫

四川人民对大熊猫非常热爱和关心。申报世界遗产文本的附件3列举了提名地区在过去20年中救助大熊猫的情况。被救助的47只大熊猫中（不包括经监护自行归隐的25只），有25只在恢复健康后被放归自然，21只留卧龙中国大熊猫保护中心、成都大熊猫繁育研究基地或转移到国内外的一些动物园，1只重病患者抢救无效死亡（另有7只在野外发现的尸体，经验尸属自然死亡）。尽管多数适时和适地地送回野外，但圈养的数量仍占被救助数量的近半数的比例。结果既减少自然状况下的种群数量，也给圈养地增加了压力。

在许多情况下这些救助行为是必要的，但也存在不了解大熊猫的生活习性而误捉，和极少数为奖赏而捕捉健康大熊猫的情况。为了避免这种情况的发生，林业部于1988年停止了奖励资金，并于1989年专门发布了有关抢救大熊猫的严格规定。目前圈养的大熊猫数量已经足够维持健康的圈养种群。不应该为这个目的再继续从野外捕捉大熊猫。圈养种群应该采取有效的繁殖措施，保证种群的自我维持，并要积极实施圈养繁殖的大熊猫放归到野外的项目。

2.3.12 保护区管理的能力不足

尽管国家和主管部门在建立自然保护区和风景区上做出了极大的努力，但大多数保护区仍存在资金缺乏、能力不足的问题，因而影响了管理的有效性。作为自然遗产地最基本的单元，提高自然保护区和风景名胜区管理的有效性也是遗产地管理的主要任务之一。

提名地区的经济很不发达，上述为改变贫困状况而出现的与大熊猫争地、争夺生存空间的结果，导致大熊猫种群栖息地的岛屿化，国家制订的自然资源保护法律，在一定程度上受到地方经济发展的冲击。国家的退耕还林和天然林保护计划可以提供一定的经费补偿，但是，真正解决问题还需要大量的资金投入，被列入世界自然遗产可以帮助鼓励和吸引资金的投入。

2.4 自然灾害

提名地处在高山峡谷区域，环境条件复杂，自然灾害比较频繁。地震、洪水、泥石流与滑坡、森林火灾以及箭竹开花枯死是主要灾害。

2.4.1 地震

提名地处在中国西部南北地震带上，属强震活动区。历史上发生过3次6级以上地震：1927年9月的6.5级地震，震中位于喇叭河自然保护区的北端；1941年6月21日6.0级地震，震中位于喇叭河自然保护区南端西侧；1970年2月24日6.25级地震，震中位于大雪峰景区东南缘。

2.4.2 洪水

夹金山脉地区24小时降水可达150 mm、72小时降水可达220 mm，形成大洪水的机率为年均1.5次。1966年7月27日至8月4日，宝兴县境内普降暴雨，大洪水摧毁盐井区政府所在地的全部房屋与耕地。

2.4.3 泥石流与滑坡

提名地属泥石流、滑坡的中度危险区，但分布很不均衡。1964年7月8日宝兴县邓池沟暴雨引发泥石流，造成29人死亡，两个自然村被迫搬迁；四姑娘山地区在最近的40年中曾发生不同程度破坏性的泥石流10余次。

2.4.4 森林火灾

随着国家森林保护法规的贯彻，最近30年中未发生大面积森林火灾，但山区农民垦荒烧地与烧灰积肥所引发的小范围森林火险时有发生。严防森林火灾仍是遗产管理的一项重要工作。

2.4.5 主食竹开花枯死

冷箭竹是大熊猫的主食竹之一。80年代初发生的大面积冷箭竹开花枯死曾造成一批大熊猫饿死。据调查，1983年提名地冷箭竹开花面积达60%以上，在重灾区的卧龙与宝兴县西北部的扑鸡沟一带达95%，海拔2300～3500 m除小块面积未开花外，几乎全部开花结实并枯死。这一事件曾引起了媒体的广泛报道。尽管竹子开花是竹子正常生理周期的一部分，且大多数大熊猫栖息地生长着两种或以上的竹子，如生长在卧龙的冷箭竹和缺苞箭竹，然而由于大熊猫栖息地已经出现了破碎化，竹子开花有可能在孤立的小片栖息地给大熊猫带来灾难。因此，减少竹子开花对野生大熊猫种群产生不利影响的最佳对策是确保栖息地的连接和通道，防止孤立小种群的形成。因此，保护大熊猫栖息地的完整，重建栖息地片段间的连接是遗产地管理的一项核心工作。

3. 遗产地保护管理对策

本规划力求做到各主要责任相关者的参与。以下政府机构和部门参与了本规划的制订过程：省建设厅、省林业厅、省计委、省环保局、省国土资源厅、省旅游局、雅安市政府、成都市政府、阿坝州政府、甘孜州政府、提名地各自然保护区和风景区及所涉及的县政府等。这些部门都分别签署了有关的确认文件。

3.1 保护管理的目标

3.1.1 总目标(长远目标)

使自然遗产地中以大熊猫为代表的生物多样性和自然生态系统得到有效保护，使区内的人民生活和社会经济发展与自然和谐。

3.1.2 具体目标

• 大熊猫种群和栖息地的有效保护，使这个“旗舰物种”在遗产地长久地生存、繁衍并发展；

• 遗产地内具有全球重要性的稀有濒危物种和生物多样性以及景观和地貌特征的有效保护；

• 长江上游水源涵养地和森林生态系统的有效保护；

• 区内丰富多样的文化遗产的保护和发扬；

• 遗产地内社区的可持续发展—减少发展活动对环境的压力，开展管理良好的、可持续的生态旅游和其他于环境无害的生计活动；

• 公众保护意识的提高和对保护行动的参与—使遗产地成为一个教育和宣传的基地。

3.2 保护管理的体制

3.2.1 对遗产地实行功能区划管理

• 功能区划的原则

为了保证遗产地管理的可行性和有效性，依照《四川省世界遗产保护条例》的规定对所提名的遗产地进行了功能区划，以便分区、有针对性地进行管理。所划分的区域有如下类型：遗产地分为核心区(Core Zone)和保护区(Buffer Zone)；遗产地周边又限定了外围保护区(Transitional Zone)。

在划定边界时考虑了以下原则：

1）遗产地的边界主要考虑覆盖邛崃山脉大熊猫分布区和重要、特殊的自然生态景观。

2）遗产地核心区是：

- 大熊猫的集中分布区；
- 保存较完整的现有大熊猫栖息地；
- 生物多样性的集中分布区和重要物种的模式标本产地；
- 保留相对完好的原生生态系统和自然景观；
- 人类活动稀疏，居民人口密度小于 0.2 人 /km²；
- 尽可能地包括自然保护区和风景名胜区的核心区。

3）遗产地保护区是核心区以外的遗产地部分，人口密度小于 4.9 人 /km²。

4）遗产地外围保护区是为了确保遗产地的保护而需要控制的区域。

如此划定的面积为：

世界遗产提名地面积 9 510 km²，其中核心区 5 370 km²，保护区 4 140 km²。

世界遗产提名地外围保护区面积 5 290 km²。

提名地及其外围保护区面积的政区分布如下表：

提名世界自然遗产地的政区分布

政区		世界遗产提名地 (hm^2)	核心区 (hm^2)	保护区 (hm^2)	外围保护区 (hm^2)
阿坝州	汶川县（含卧龙特区）	233 000 (200 000)	189 000 (172 000)	44 000 (28 000)	53 000
	小金县	98 000	7 000	91 000	154 000
	理　县	82 000	4 000	78 000	46 000
	小　计	413 000	200 000	213 000	253 000
雅安市	宝兴县	232 000	178 000	54 000	74 000
	天全县	97 000	63 000	34 000	29 000
	芦山县	58 000	40 000	18 000	40 000
	小　计	387 000	281 000	106 000	143 000
成都市	都江堰市	16 000	4 000	12 000	9 000
	崇州市	20 000	11 000	9 000	17 000
	大邑县	15 000	10 000	5 000	25 000
	邛崃县	0	0	0	21 000
	小　计	51 000	25 000	26 000	72 000
甘孜州	康定县	93 000	31 000	62 000	53 000
	泸定县	7 000	0	7 000	8 000
	小　计	100 000	31 000	69 000	61 000
合　计		951 000	537 000	414 000	529 000

提名世界自然遗产保护区的遗产地单元分布

政区	遗产地单元	世界遗产提名地（hm^2）			外围保护区（hm^2）
		小计	核心区	保护区	
阿坝藏族羌族自治州	卧龙国家级自然保护区	200 000	172 000	28 000	-
	四姑娘山（国家级）风景名胜区	45 000	7 000	38 000	-
	四姑娘山国家级自然保护区	53 000	-	53 000	154 000
	米亚罗（省级）风景名胜区（毕棚沟景区，红叶景区）	82 000	4 000	78 000	46 000
	草坡省级自然保护区	33 000	17 000	16 000	53 000
雅安市	蜂桶寨国家级自然保护区	54 000	34 000	20 000	-
	夹金山（省级）风景名胜区	178 000	144 000	34 000	74 000
	喇叭河省级自然保护区	24 000	20 000	4 000	-
	二郎山（省级）风景名胜区	73 000	43 000	30 000	29 000
	黑水河省级自然保护区	37 000	26 000	11 000	-
	灵鹫山一大雪峰（省级）风景名胜区	21 000	14 000	7 000	40 000
成都市	青城山一都江堰（国家级）风景名胜区	16 000	4 000	12 000	9 000
	鸡冠山一九龙沟（省级）风景名胜区	20 000	11 000	9 000	17 000
	西岭雪山（国家级）风景名胜区	15 000	10 000	5 000	25 000
	天台山（省级）风景名胜区	-	-	-	21 000
甘孜藏族自治州	仓汤一孔玉省级自然保护区	93 000	31 000	62 000	53 000
	岚安(拟建省级)风景名胜区	7 000	-	7 000	8 000
合计		951 000	537 000	414 000	529 000

提名世界自然遗产保护区在各县的百分比

序号	各县总面积与人口			核心区		提名地		外围保护区		提名地+外围保护区	
	县别	km^2	万人	Km^2	%	km^2	%	km^2	%	km^2	%
1	宝兴	3 114	5.5	1 780	57	2 320	75	740	23	3 060	98
2	汶川	4 083	11.0	1 890	46	2 330	57	530	13	2 860	70
3	芦山	1 193	12.3	400	34	580	49	400	34	980	82
4	天全	2 390	14.3	630	26	970	41	290	12	1 260	53
5	崇州	1 090	64.6	110	10	200	18	170	16	370	34
6	大邑	1 338	49.6	100	7	150	11	250	19	400	30
7	都江堰	1 208	59.4	40	3	160	13	90	7	250	21
8	康定	11 423	10.8	310	3	930	8	530	5	1 460	13
9	理县	4 313	4 4	40	1	820	19	460	11	1 280	30
10	小金	5 583	7.7	70	1	980	18	1 540	28	2 520	45
11	泸定	2 165	7.7	-	-	70	3	80	4	150	7
12	邛崃	1 378	64.0	-	-	-	-	210	15	210	15

· 功能区管理的准则

遗产地的功能区划及其保护和管理遵循下列法规：

《四川省世界遗产保护条例》（四川省第九届人民代表大会常务委员会第 27 次会议通过，2002 年 1 月 18 日公布，2002 年 4 月 1 日起施行）。

《中华人民共和国自然保护区条例》（中华人民共和国国务院令第 167 号，1994 年 10 月 9 日公布，1994 年 12 月 1 日起施行）；

《四川省自然保护区管理条例》（四川省第九届人民代表大会常务委员会第 11 次会议通过，1999 年 10 月 14 日公布，2000 年 1 月 1 日起施行）；

《风景名胜区管理暂行条例》（1985 年 6 月 17 日国务院发布）；

《四川省风景名胜区管理条例》（四川省人民代表大会常务委员会第 9 次会议通过，1994 年

5月28日公布施行);

《中华人民共和国国家标准: 风景名胜区规划规范》(GB 50298-1999, 国家质量技术监督局、中华人民共和国建设部1999年11月10日联合发布, 2000年1月1日起施行)。

各功能区的管理还应遵循下列原则:

核心区 不允许任何目的的砍伐、狩猎、 烧山、采集、居所开发、采矿和工业生产活动; 不允许新建公路、大中型水利工程等基础设施和扩建已有基础设施; 不允许大众旅游进入核心区; 放牧只允许在指定范围的高山草甸上, 以起到维护高山草甸的作用; 科学研究应限制在非破坏性的采集、观察和监测上。在废弃的耕地上应注重栖息地的恢复; 已有的矿区和污染性工业应关闭; 对区内的居民提供优惠的条件以鼓励其自愿向区外移民。

保护区 因有人类的居住而允许有限制的人为活动。在此区域内农业不应再扩张, 所有坡度大于25° 的农业用地应采取人工促进自然更新的做法尽快恢复栖息地, 重建大熊猫种群的通道; 道路和其他基础设施的建设应严格控制, 如必需修建时应进行严格的、科学的环境评估和监测; 可开展旅游, 但必须将游客的数量控制在环境容量以内, 并及时监测旅游对环境的影响; 区内居民对自然资源的依赖应通过寻找替代来源的方式逐渐减少; 已有的矿区和污染性工业应逐渐关闭。

外围保护区 位于提名地之外, 但大多数地区仍位于现有保护区和风景区之内, 其主题依然是保护。在此区内不应允许打猎、烧山等活动; 对森林资源的利用必须建立可持续的机制; 坡度25° 以上的耕地应按照现行政策的要求退耕还林; 不允许新建对环境有害的工业和矿区, 已有的要逐步关闭; 大中型基础设施建设必须进行严格的环境评估; 开展旅游时应对游客人数进行监控, 最大限度地减少他们对环境的负面影响。

3.2.2 管理机制

提名地地涵盖2州2市12县的地域, 包括由林业、环保和建设部门主管的16个遗产地单元, 遗产地的管理涉及多部门的协调和统一。四川省政府为此成立了一个跨部门和机构的世界遗产申报领导小组, 并在省建设厅下设工作办公室。为了确保遗产地的有效管理, 需要进一步理顺和明确遗产地管理的机制。

1)在世界遗产申报领导小组的基础上成立由主管副省长牵头的"四川省世界遗产管理委员会", 成员包括省建设厅、文化厅、林业厅、环保局等相关部门、以及遗产地所在地的州或市政府的代表, 具有足够的行政权威性。

2) 四川省世界遗产管理办公室是该委员会的执行机构, 挂在省建设厅。

3) 该委员会还将设立一个多学科的专家委员会, 以确保管理的科学性。

4) 遗产管理委员会和办公室的职责主要有以下几方面:

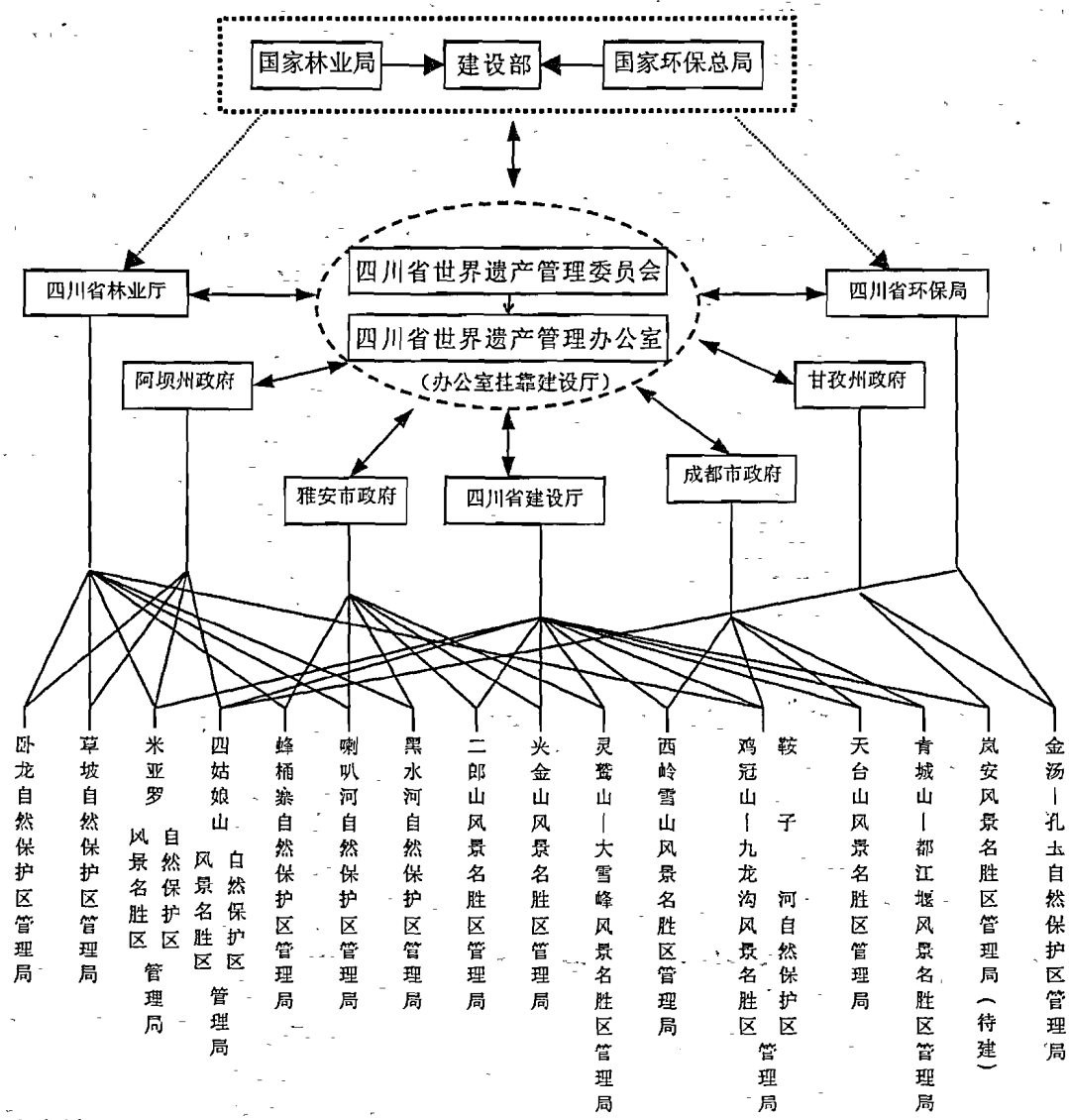
• 依靠现有管理体系, 对遗产地的管理提出综合和统一的要求, 建立机制, 保证部门间定期的交流和协作, 并协调遗产地保护与经济和社会发展部门之间协商, 出台必要的政策、管理原则和法规;

• 负责协调对遗产地持续的监测和定期评估。监测和评估应保证综合性、独立性和科学性;

• 组织编制和实施遗产地保护规划。

5) 遗产地管理的单元是自然保护区和风景名胜区。各保护区依照现有的管理体制，在行业上服从其主管部门的管理，在社会行政事务上服从所在地州、市和县政府的领导，因此，各主管部门在管理上的责任和权限不变。世界遗产地建立后各部门在操作上与以往的主要不同，体现在按照世界遗产地管理的要求增强跨部门的协作和对遗产地的保护监测。

6) 世界自然遗产管理的机制图解如下：



3.3 遗产地保护管理项目活动

以下列出的项目内容一些在计划中，一些已进行，由各主管部门负责。我们的目的是把遗产地内开展的项目协调起来，使之向共同的目标努力，以获得最大的效益，避免重复。

3.3.1 管理项目

保护区扩建 结合省政府批准的“四川省野生动植物保护及自然保护区建设工程”，扩大提名地中自然保护区的面积。有的风景名胜区也要按照世界遗产保护的要求，扩大保护范围。

遗产地单元的有效管理和保护 结合各自然保护区和风景区已有的保护管理框架和总体规划，在遗产地单元内按照遗产地的要求确定和调整具体的保护目标和措施，加强执法，制订各遗产地单元的管理计划并进行实施。

实施大熊猫等重点濒危动植物的保护计划 这是四川省野生动植物保护及自然保护区建设工程的一部分，由省林业厅牵头，已列入国家计划。

恢复栖息地，保护和重建大熊猫走廊 结合现有的国家政策，如天然林保护工程和退耕还林工程，把25°以上的坡耕地按照大熊猫栖息地的要素恢复其生境，在栖息地的关键连接地带加大保护力度，或者重新建立栖息地的连接。

特别要注意维护大熊猫分布区里脆弱的瓶颈或通道的畅通。通过卫星遥感图片和野外调查，特别是最近的第三次大熊猫调查，这些通道已经被识别。这些通道不仅为不同山谷地带孤立的大熊猫亚种群之间建立了联系，更为重要的是维持大熊猫整个种群之间的完整性。当成年的雄性大熊猫不能在出生地获得统治地位时可以转移到近邻种群以获得更开阔的雄性领地。同时，这些通道对减少由于竹子大面积开花造成的损失也是极为重要的。大熊猫通过安全通道，进入近邻山谷，那里的竹子可能种类不同，而且更为丰富。特别要注意维持和保护通道的植被和竹子的覆盖率以便为大熊猫从一个地点转移到另一个地点提供条件。在由于砍伐或农业活动造成的通道被蚕食的地方，应采取积极的栖息地保护措施，包括种植郁闭度高的树种和适宜的竹子种类以形成下层林木。要尽可能恢复遗产地和外围缓冲地带的自然植被，退耕所有核心区内的坡耕地，并将废弃的农田恢复为自然植被，恢复被砍伐的的林地，根除可能立足于当地自然植被的外来的入侵物种。要采取积极的行动保护栖息地，避免由于自然或人为因素而导致泥石流和滑坡。

治理和减少遗产地内的采矿和工业污染 核心区的矿区与污染型企业要立即关闭；在保护区内的此类企业也要逐渐关闭。在外围保护区，要求对矿区与工业进行严格的监测，对于其中对环境造成危害的企业将分期关闭或整治。被采矿破坏的栖息地要依情况进行恢复。具体实施办法在本规划的准备阶段已由四川省世界遗产管理办公室同当地政府协商。

严格控制遗产地内的人口 介绍健康教育与计划生育的工具，对于居住在核心区内的居民，将建立鼓励机制，倡导自发的搬迁。

遗产管理的社区参与 位于遗产地内部及其外围保护带的社区要把社区发展计划与世界遗产地管理的标准相结合； 在此，本规划的制定已将社区考虑进来，为达到社区发展与遗产地管理的和谐统一提供指导。

管理计划的制定和修订 一旦申请通过世界遗产委员会的批准，所有参与的单位都会被邀请来审阅目前的规划书；如有需要，还要做工作，使各单位与此总体规划的内容达到一致。此后，对于规划的进一步修改、添加其他附属的地区、或是在现划定的遗产地范围内规划的修订，都要以参与式的方式进行，并由四川省世界遗产管理委员会批准。每五年作为一个周期，要对遗产地的管理办法进行总体修订，从而保证管理的标准、规定与法律保证以及其它的支持体系可以重新被评估并依情况进行调整。通过监测收集的信息在管理计划及其更新中将有所体现。四川省世界遗产管理办公室将作为组织者，邀请所有遗产管理单元的管理层，也包括政府单位与非政府组织，以参与式的方式对总体规划修订中的问题及策略进行讨论。

3.3.2 监测

目前在该地区的大熊猫保护区中，一个监测系统已经设计完毕并开始投入使用。中国科学院与四川林业科学研究院也设立了监测站用于监测各种生态学指标。本规划将目前的监测系统扩大，在各家研究单位间建立一个网络，用于整合收集的信息，并从地理位置上与技术上补充现有的监测系统没有覆盖的空缺。补充监测将由遗产地内各单元的工作人员进行，事先要对他们进行适当的培训。世界遗产专家委员会的科学家与工作人员将为这些培训提供技术上的支持。每个遗产地单元都要建立数字化的数据库。省世界遗产办公室负责协调每个单元的监测计划与活动情况；一个研究单位将被指定负责从每个单元收集信息并综合分析动向。另外，还要建立一个基于 GIS 基础上的管理系统。

监测项目有几个组成部分。注意其中很多项在开始时获取准确可靠的基础调查数据是至关重要的。

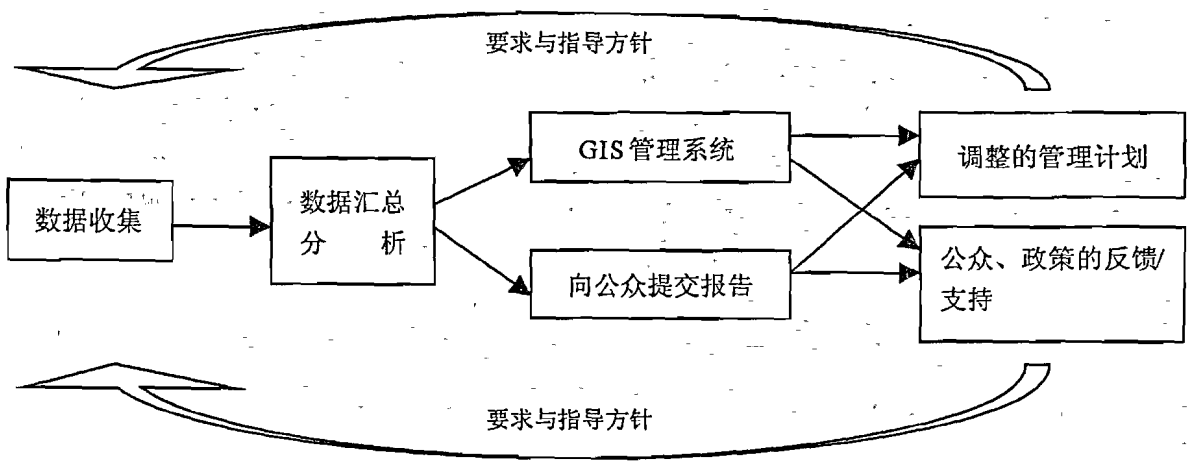
下表总结了要监测的不同目标（包括基础数据收集），并根据各监测目标的情况推荐了负责监测的单位：

遗产地保护监测内容简表

监测收集的信息	负责单位
通过不同时段的卫星图片分析整体植被覆盖情况	四川的一家研究机构
物理参数：气象、水文与大气沉淀物载量	通过培训的保护区工作人员与相关的生态观测站
在各管理单元内通过步行调查与样方测量了解到的植被，尤其是竹子的状况	各保护区的工作人员
步行调查与阶段性重查所报告的大熊猫与其它重要野生动物的情况	各保护区的工作人员
当地社区的社会经济状况以及他们的生活趋势	通过培训的保护区工作人员与四川遗产管理办公室签约的调查人员
旅游业发展、游客的数量、旅游的收入以及旅游对遗产地环境的影响	通过培训的保护区工作人员、县环保局与旅游局
外围保护地带中剩余的工业污染	省级与各县的环保局与签约的研究单位
现行项目的进展情况与政府政策上的变化	负责各项目实施的单位与签约的研究单位

只进行监测而没有适当的报告是无意义的。各遗产地管理单元除了要向各自的主管单位按常规程序报告之外，还要求定期向四川省世界遗产管理办公室提交报告。遗产办负责将这些报告汇总，每年提交整个遗产地的年度进展报告。

一个完整的监测框架图示意如下：



3.3.3 研究

研究计划包含了几个方面和很多子项目。研究应该由不同部门、研究机构和大学承担，还应包括国际合作者以及国际合作项目。

研究计划应建立在已经取得的大量研究成果和正在进行的研究基础之上，特别是卧龙和都江堰正在进行的研究以及四川及外省的研究机构、大学和组织长期关注的课题和研究成果。

应鼓励那些能够帮助改善遗产地管理和保护的研究，特别是以下方面：

- 通过遥感数据以及野外监测和调查的数据建立 GIS 数据库，监测植被变化情况；
- 继续研究大熊猫以及其它珍稀野生生物的生态学（如雉、金丝猴、小熊猫、扭角羚等）；
- 对所选择的物种进行圈养繁殖和放归实验；
- 竹种的生态学和开花模式；
- 继续对没有调查的地区和了解较少的生物类群进行研究；
- 栖息地恢复的方法；
- 特殊类群，杜鹃花、百合花和雉的分类方法研究；
- 各遗产地单元的环境本底研究；
- 遗产地景观生态网络动态管理研究；
- 药用植物的人工培植和加工；
- 社会经济研究和调查。

所有研究的申请按照现行的管理体制向主管部门或者科研管理部门提交。管理机构与研究人员间应就每一项研究签订明确的协议，写明研究的性质、研究结果的知识产权归属、标本副本的存放、书写报告和出版的规定以及引用文献的要求等。合作双方所需提供的条件也要具体说明，如协助解决住房、交通工具、翻译、地图或其它数据和所需的资料等。各管理单元可以根据提供协助的情况收费。所有的外籍研究人员必须由国内相应单位的同行陪伴，涉及费用由外籍研究者承担。

3.3.4 保护意识的宣传和教育

一个综合性的宣传教育项目将针对以下三组人群展开：

- 当地村镇的学校；
- 保护区内的社区；
- 参观者和游客。

通过与各自管理单元的合作，建立一系列信息与资料处理中心。现有的博物馆、对外开放的繁育中心和教育中心要进行改进。此外，还要制作地图、展览、印发小册子和其他有关材料。

在当地学校中要开设专门课程，针对学龄儿童讲授维护江河流域功能的重要性、防火和介绍当地格外丰富的的生物多样性情况。这些课程要培养儿童对当地自然与传统的热爱和自豪，同时也用实例证明，通过精心的保护和发展生态旅游能够增加当地的经济收益。学校要组织学生远足，让孩子们感受在他们身边的美丽的风景和野生生物。

通过远程服务将有关恢复森林、控制侵蚀、垃圾处理、流域保护、生物多样性的重要性等一些特别的宣传材料送达保护区内偏远的村庄和家庭。此外，还要通过有教育意义的张贴物和积极采取措施来发展更多可持续的和新的生活方式来加强宣传的力度，让这些生活方式在保护、

监测、研究、旅游和其它积极措施中得到体现。

3.3.5 管理培训

目标与任务 通过传播世界遗产新理论、新信息、新技术与新方法，统一保护监测与GIS管理的质量标准和方法，更新知识，提高科学技术水平，发展国内与国际的世界遗产管理学术交流，培训高素质遗产管理技术骨干。

基本内容

• 基础知识 遗产资源管理基础，UNESCO《保护世界文化与自然遗产公约》、《四川省世界遗产保护条例》以及国家和地方相关法规，世界遗产概要。

• 管理技能 GIS应用，保护监测质量标准与方法，世界遗产定期监测报告编制方法。

• 国内外世界遗产管理学术交流。

组织要点

• 四川省世界遗产管理办公室组建全省世界遗产培训中心。

• 组织专家编写教材与授课，邀请世界遗产中心（UNESCO）和相关国际组织的专家讲学。

• 鼓励遗产管理人员参加国家高层次进修和高学历深造。

• 在2003～2010年的四川省世界遗产管理培训计划期间，全部管理人员都经过1～2次培训，总人数800～1 200人次。

3.3.6 旅游管理和生态旅游的发展

生态旅游在世界上发展很快，在中国也是如此。除国际游客的人数持续增长之外，中国国内生活水平的提高也导致国内游客数量的快速上升。要发展的生态旅游项目的目标是提高当地经济的收入水平，同时进行教育、提高公众的意识。

生态旅游的级别与发展的类型，必须严格控制在各景区和相关的文化区域的环境容量之内，并尽可能减少对野生动物的干扰，保护自然环境，尊重当地文化。大力支持由当地社区发展的小规模、低影响的旅游企业，以确保旅游收入的大部分留在当地，并能进一步加强对遗产地的保护。

为了确保这些原则得以贯彻，世界遗产地的旅游发展所必需的开发建设规划都必须得到四川省世界遗产管理办公室的审查和四川省世界遗产管理委员会的批准。在前文列出了一个正在准备发展的或已经在进行旅游管理的风景区的名单。今后这个名单可能还会增加，以应对不断增长的对旅游景点的需求，并把旅游带来的压力分散到更多景区。

例如，在宝兴到蜂桶寨的主干道附近的邓池沟，建立一个特别的博物馆，以纪念和展示戴维传教士杰出的标本收集工作。原名穆坪的宝兴县，是世界上生物模式标本最大的产地之一。1862～1875年在穆坪天主教堂行使神职期间，戴维不仅向世界第一次描绘了大熊猫，还第一次收集了其它哺乳动物标本、鸟类标本（其中65个新种）和其它几百个动植物的模式标本。这些模式标本种很多都被精彩地刻在宝兴路边的大理石板上。这样一个博物馆将引起进入宝兴县境内游客的极大兴趣，对当地政府和人民也是一种骄傲和鼓舞。这个博物馆也能揭示这样一个生物多样性遗产地的国际地位与全球意义。

遗产地要制定一个总体的旅游管理计划，用于控制旅游设施的发展，并建立对遗产地内不

同的功能区旅游发展的标准。

3.3.7 社区可持续发展

当地已经很贫困的社区在农耕与放牧方面受到进一步限制后，贫困将更为加剧，而通过积极地支持一个致力于不以破坏为代价，提倡可持续的生活方式与工业的项目，这种状况有望得到很大程度上的改善。有必要为此做一个评估，找出适当的对象组与可行的方法，发展对环境有益的生活方式。这显然是一个长期的工作。一个有用的方式是让社会发展机构与自然保护区与保护组织共同工作与探讨。

这个地区可能的社区发展项目有：

- 替代能源，如沼气和小型水电站；
- 可持续性的非木材林产品(NTFP)的采集与市场营销；
- 建立在社区基础上的生态旅游，尤其是家庭旅馆、导游的培训与手工艺品的制作；
- 先进的、对环境有益的农业技术的培训；
- 贵重经济林木的种植；
- 可持续性生活方式技能的培训。

发展这些新的生活方式必须与社区参与保护工作相联系，这一点很重要。

4. 投资概算

由于遗产地由多个不同的部门管理，每个部门有各自的预算和管理计划，一些部门的计划只有一部分在遗产地的范围内，因此很难给出现在和未来的资金投入情况以及未来不同的资金来源。比如中国最近已经实施的西部大开发战略，将对西部地区实行投资倾斜，以帮助西部地区的经济发展。这些资金将用来改善交通、通讯、能源等基础设施和旅游设施，转变生活方式，保护森林和植树造林。

另外，由国家林业局与四川省林业厅实施的退耕还林还草工程与野生动植物保护及自然保护区建设工程为大熊猫栖息地的恢复、自然保护区的扩大与新建、法律的执行、保护区的管理、以及大熊猫与其它野生动物的研究提供了数额可观的支持。

500多个政府工作人员的工资已经由省政府或县政府财政来支付。政府对于旅游业和其他产业的投资增长也很快。毫无疑问，一旦大熊猫的长期租借款到位，将全部用于重新投资保护大熊猫，四川省人民政府也将提高投资力度。这样的收入会为保护遗产地做出实质性的贡献。

下表概述了作为世界遗产地2003～2010年的预算。本预算以2000年物价为基准计算，费用将随着物价上涨而增加。

提名地 (2003～2010) 管理项目投资概算简表

单位：万元（人民币）

项　　目	预　算	资金来源
管理项目	40 400	包括政府财政报表中已批准的管理计划以及现行的政府项目，如天保工程、退耕还林以及野生动物保护与保护区建设工程
执　　法	800	包含在政府常规预算中
根治与减少采矿与工业污染对环境的破坏	39 000	国家、四川省和当地政府
建立大熊猫通道	58 000	正在实施的全国项目，如天保、退耕还林以及增补的大熊猫保护行动计划
管理规划	300	省遗产办与各保护区协调
监　　测	2 900	各保护区日常开支，四川省遗产办争取更多的资金渠道
研　　究	5 800	很多国家级、省级项目加上寻求国际合作
教育/宣传	3 000	省与当地政府
发展生态旅游	37 300	一部分靠当地政府投资，大部分靠商业投资
培　　训	3 000	寻求国际资金
社区发展	5 100	一部分资金来源于政府投资，一部分寻求国际组织资助
总　　计	**195 600**	各种来源

主要参考文献

[1] 秦自生．四川大熊猫的生态环境及主食竹更新．竹子研究汇刊，1985，4(1)

[2] John MacKinnon, et al. National conservation management plan for the giant panda and its habitat. Ministry of Forestry of the People's Republic of China and World Wide Fund for Nature. Printed by Chian Alliance Press, 1989

[3] 四川省林业勘察设计研究院，四川省野生动物资源调查保护管理站．四川省喇叭河自然保护区总体规划设计．1994

[4] 四川省城乡规划设计研究院．西岭雪山风景名胜区总体规划．1994

[5] 欧阳志云，等．地理信息系统在卧龙自然保护区大熊猫生境评价中的应用研究．中国生物圈保护区，1995, (3)

[6] 四川省城乡规划设计研究院．鸡冠山－九龙沟风景名胜区总体规划．1996

[7] 国家林业局林业勘察设计研究院，四川省野生动物资源调查保护管理站．四川卧龙国家级自然保护区总体规划．1998

[8] 四川省城乡规划设计研究院．四姑娘山风景名胜区总体规划．1998

[9] 成都市规划设计研究院．天台山风景名胜区总体规划．1998

[10] 四川省康定县林业局．金汤－孔玉自然保护区总体规划设计．1998

[11] Timothy Swanson, et al. The economics of panda reserve management: A case study of Wolong Reserve, Sichuan, China. A Stady Prepared on Behalf of the China Council for International Cooperation on Environment and Development, 1999

[12] 四川省林业勘察设计研究院，四川省野生动物资源调查保护管理站．四川蜂桶寨自然保护区总体规划．2000

[13] 四川省城乡规划设计研究院．青城山－都江堰风景名胜区总体规划．2000

[14] 四川省城乡规划设计研究院．夹金山风景名胜区总体规划．2000

[15] 保罗·鲍克斯．地理信息系统与文化资源管理：历史遗产管理人员手册．南京：中南大学出版社，2001

[16] Jianguo Liu, et al. Ecological degradation in protected areas: the case of Wolong Nature Reserve for giant pandas. Science, 2001, 292(6)

[17] 四川省城乡规划设计研究院. 米亚罗风景名胜区总体规划．2002

[18] 雅安市人民政府. 四川大熊猫栖息地世界遗产提名地夹金山脉片区保护规划．2002

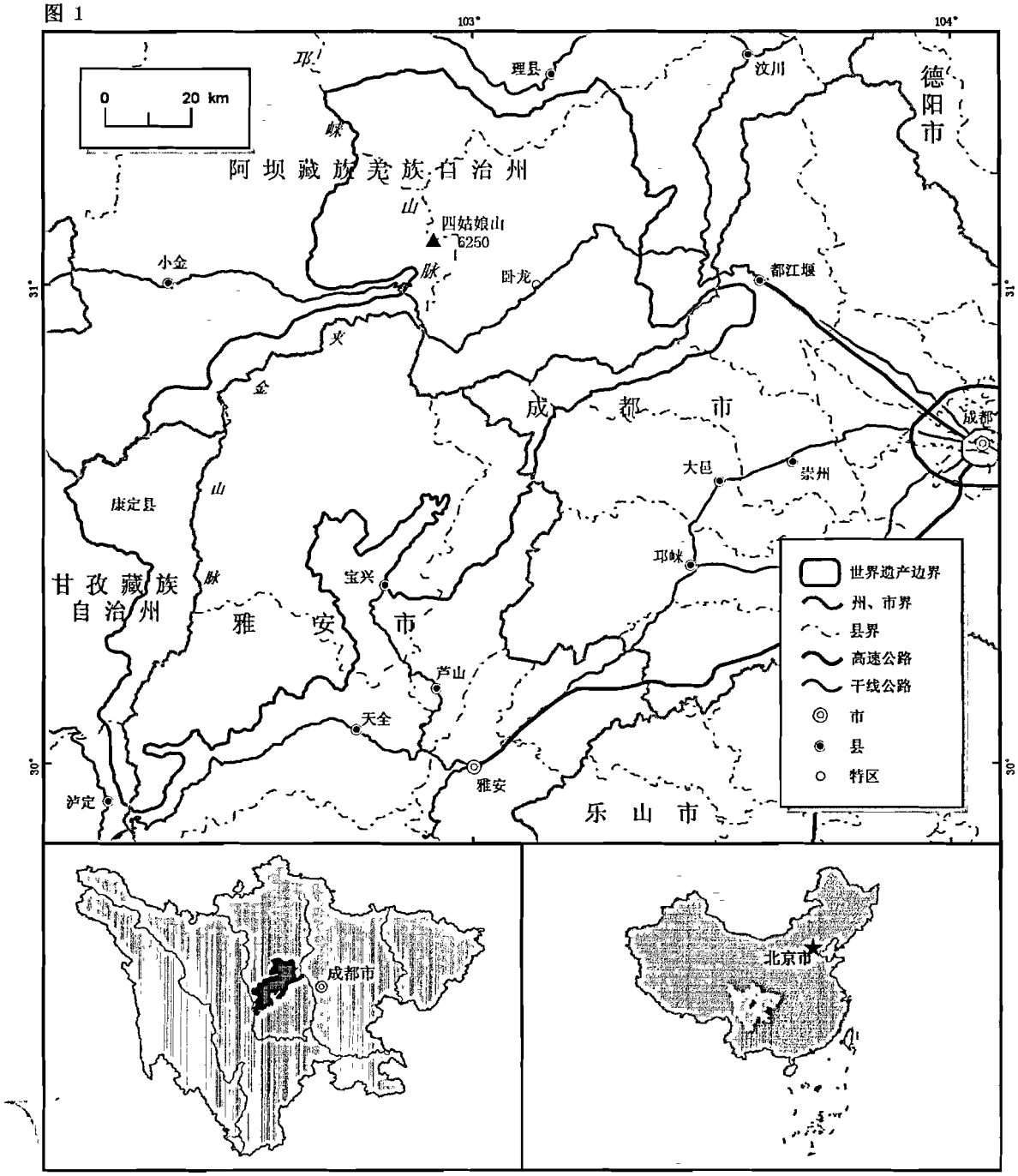
[19] 阿坝州人民政府. 四川大熊猫栖息地世界遗产提名地卧龙－四姑娘山片区保护规划．2002

[20] 成都市人民政府. 四川大熊猫栖息地世界遗产提名地西岭雪山－鸡冠山－青城山片区保护规划．2002

[21] 四川省林业厅. 四川省野生动植物及自然保护区建设工程总体规划．2002

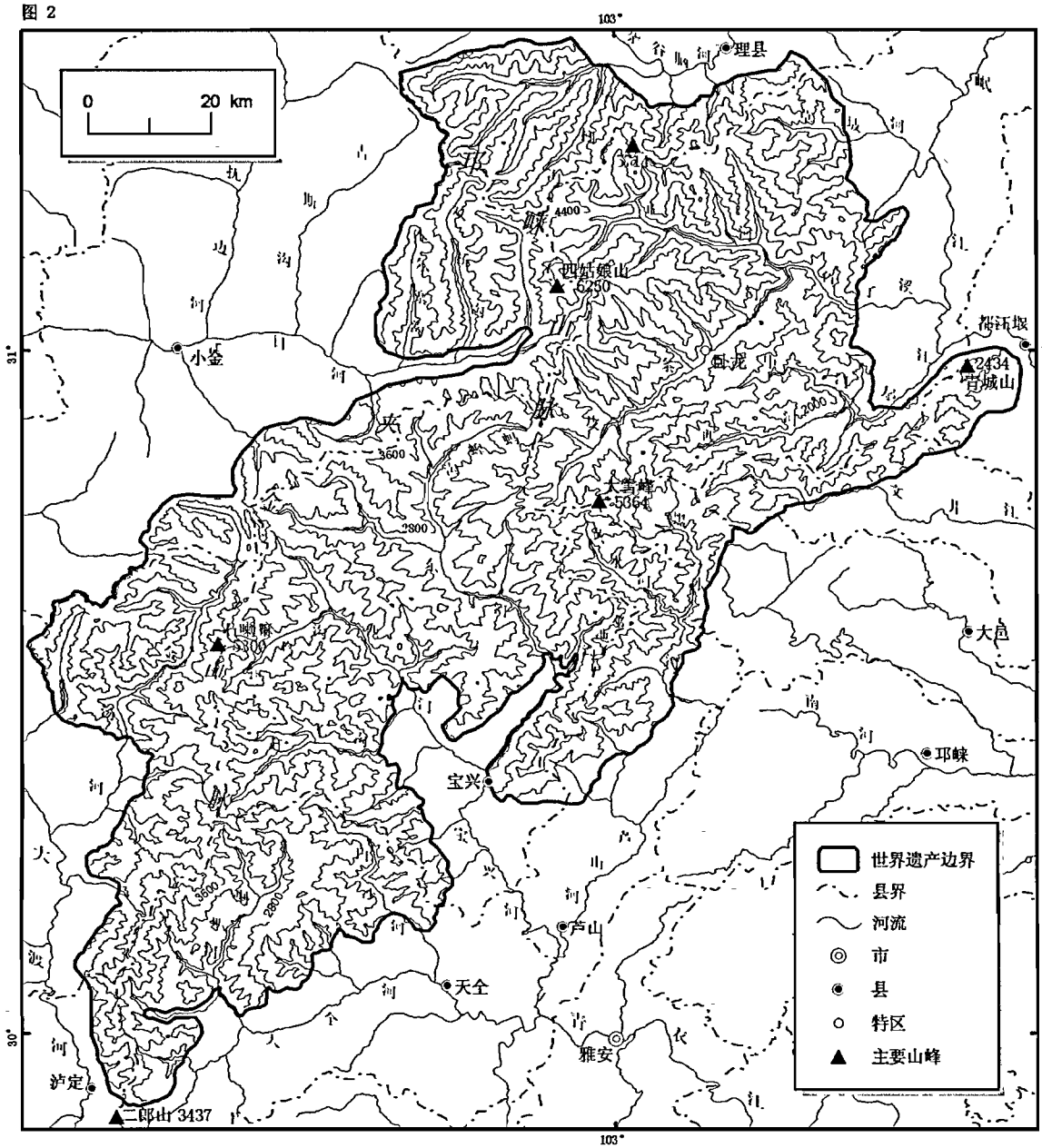
四川卧龙—夹金山脉大熊猫栖息地位置图

图 1



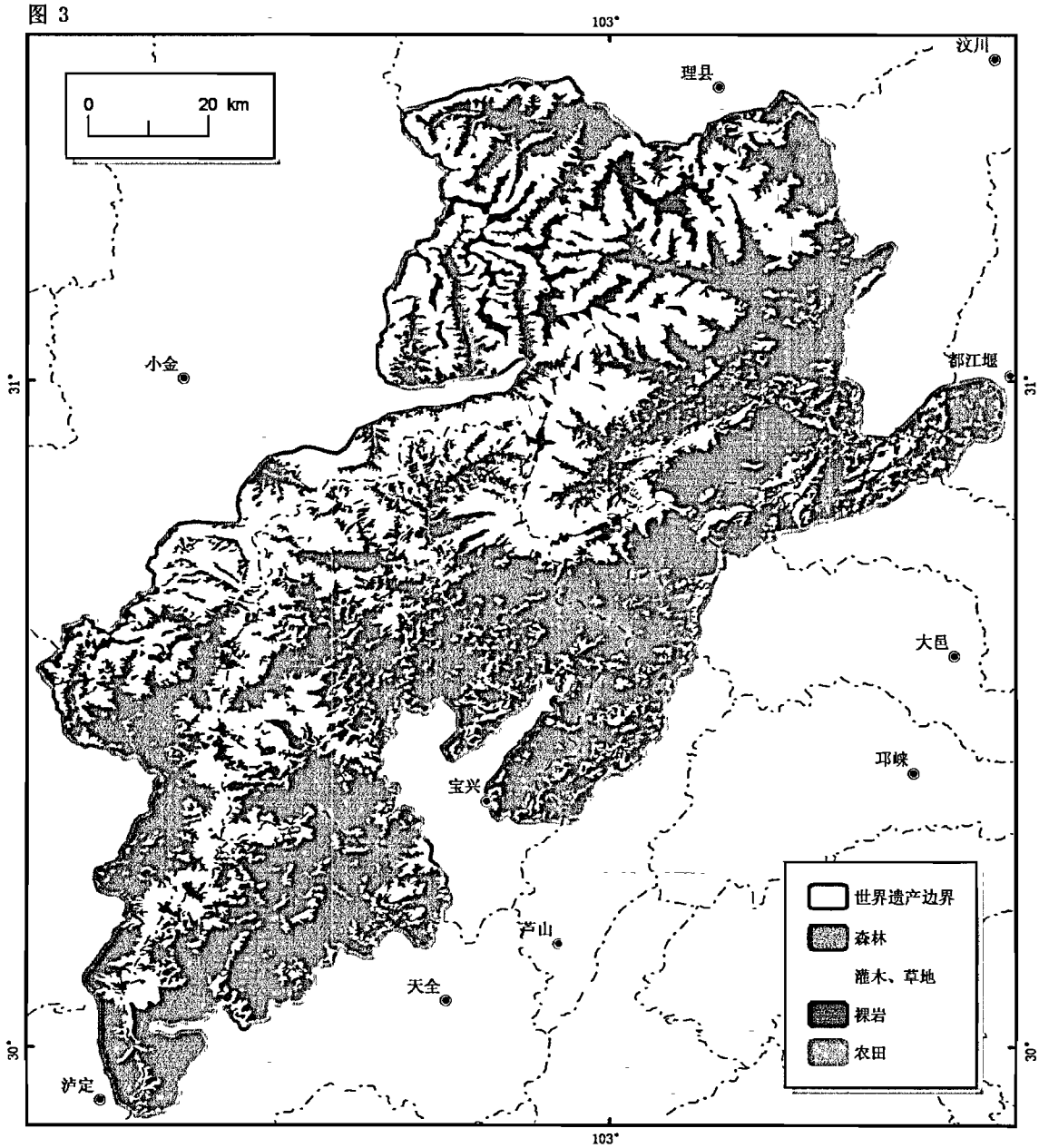
四川卧龙—夹金山脉大熊猫栖息地地形图

图 2



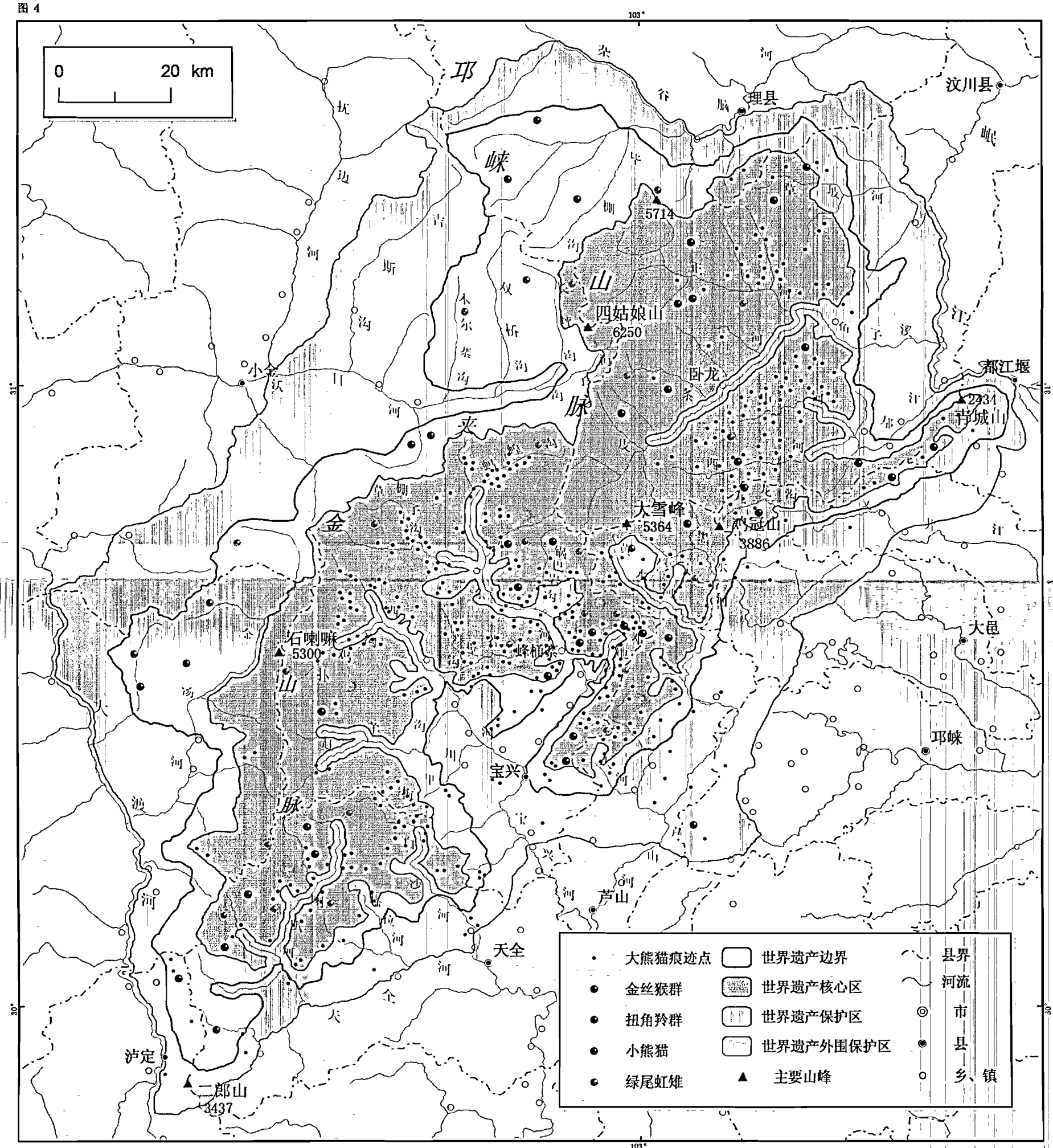
四川卧龙—夹金山脉大熊猫栖息地植被图

图 3



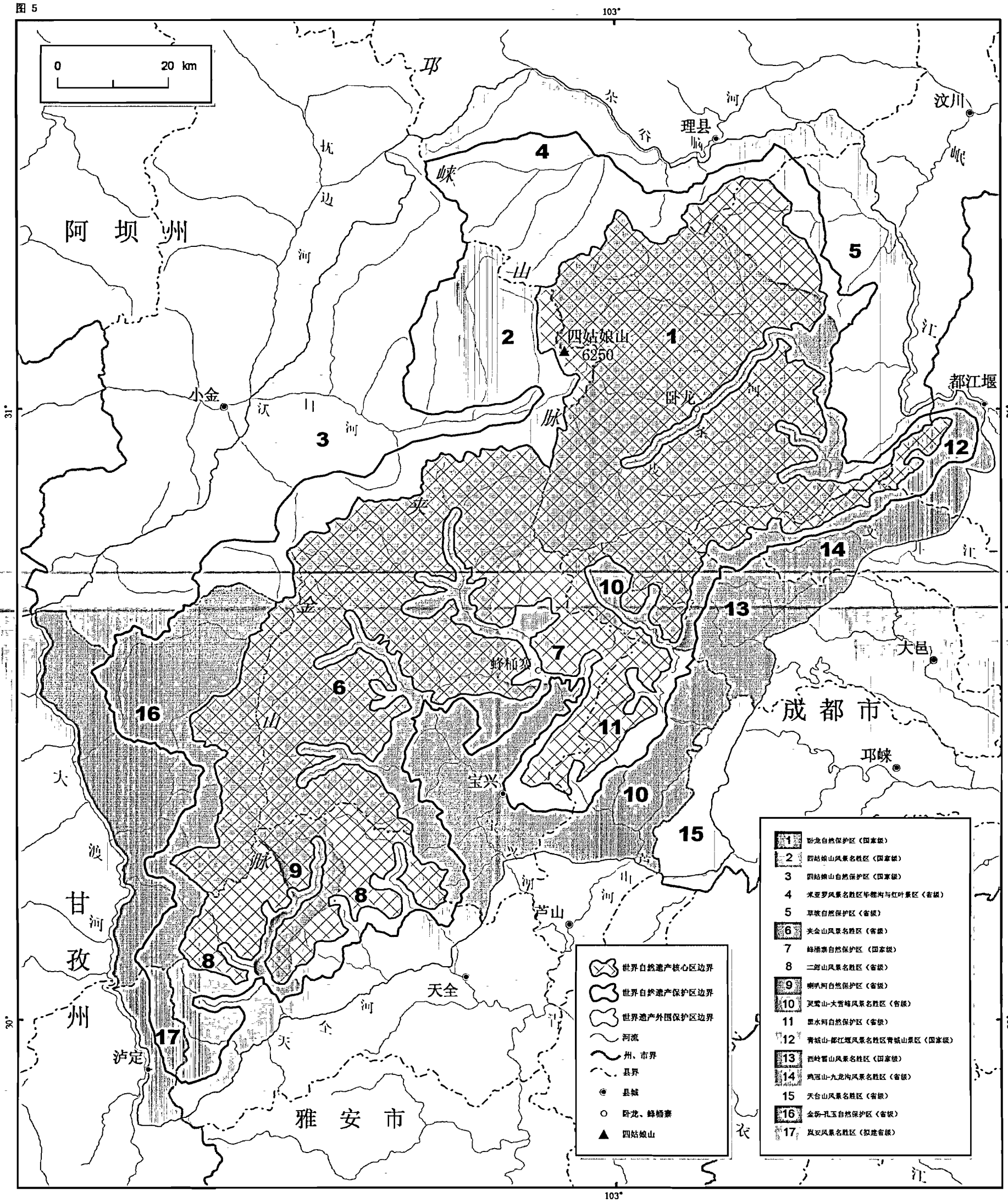
四川卧龙—夹金山脉大熊猫栖息地
世界自然遗产保护总体规划图

图 4



四川卧龙—夹金山脉大熊猫栖息地
世界自然遗产保护分区规划图

图 5



THE WORLD HERITAGE
SICHUAN GIANT PANDA SANCTUARY
—WOLONG, MT. SIGUNIANG AND JIAJIN MOUNTAINS

Overall Management Plan

The People's Government of Sichuan Province

November 2002

THE WORLD HERITAGE
SICHUAN GIANT PANDA SANCTUARY
—WOLONG, MT. SIGUNIANG AND JIAJIN MOUNTAINS

Overall Management Plan

Advisor: Chen Changdu, Hu Jinchu, Wang Song, Ma Keping, Qian Zhenyue

Editor in Chief: Yang Hongbo

Vice Editor in Chief: Mao Hui, Zhang Hu, Li Jiangguo, Xiu Jicun, Zhao Yongtao, Chen Fubin

Editor Unit: Sichuan World Heritage Administrative Office
Institute of Mountain Hazards and Environment, Chinese Academy of Sciences & Ministry of Water Conservancy

Composed by: Chen Fubin, John R. Mackinnon, Lü Zhi, Zhang Hu

Translator: Lü Zhi, John R. Mackinnon, Zhong Shengxian, Li Yong

Graphic Manager: Lan Libo

The People's Government of Sichuan Province

This Plan has been approved by the People's Government of Sichuan Province on 3 January, 2003 (“川府函（2003）2 号”).

CONTENT

1 Significance of the Nominated World Heritage ..... (1)

1.1 Introduction ..... (1)

1.2 Unique biological features ..... (1)

1.3 Site of great biological history significance ..... (12)

1.4 Largest and most successful captive breeding center of giant panda in the world ..... (13)

1.5 Spectacular scenic area ..... (13)

1.6 Additional cultural interests of Qiang and Tibetan minorities and Han temples, Taoism and historical sites including unique Qing Dynasty Catholic Mission. ..... (15)

2 Conservation Status and Pressures Facing the World Heritage ..... (15)

2.1 Conservation status ..... (15)

2.2 Socio-economic status ..... (17)

2.3 Pressures/threats ..... (18)

2.4 Natural disasters ..... (23)

3 Conservation and Management Strategies of the World Heritage ..... (24)

3.1 Management objectives ..... (24)

3.2 Management approaches ..... (25)

3.3 Conservation and management programs ..... (31)

4 Budgetary Resources Required ..... (38)

Bibliography ..... (40)

Attached Maps:

Map 1 Location Map of the Nominated Area

Map 2 Topographical Map of the Nominated Area

Map 3 Vagetation Map of the Nominated Area

Map 4 Map of the Nominated Area for the Overall Plan

Map 5 Map for Planned Protection in the Nominated Area

1 Significance of the Nominated World Heritage

1.1 Introduction

The nominated area is located in the Qionglai Mountains between the Chengdu Plain and the Qinghai-Tibetan Plateau, and includes seven nature reserves and nine scenic parks in four prefectures or cities, Aba, Ganzi, Ya'an and Chengdu. Its geographic location is between the following coordinates: E 102° 08'45"~103° 23'45"; N 29° 53'47"~31° 21'49". The nominated world heritage covers an area of 951 000 ha, including a core zone of 537 000 ha and a buffer zone of 414 000 ha. In addition, an area of 529 000 ha outside of the world heritage is designated as transitional zone.

1.2 Unique biological features

1.2.1 Giant panda as the "flagship species" of the world conservation

Giant panda (*Ailuropoda melanoleuca*) is a relict species remained from the paleo-tropic forests of the Tertiary Era. Having an alimentary canal structure typically similar to the other carnivores, it has evolved into a unique specialized herbivore of the carnivorous order, feeding almost entirely on bamboo in the wild. Of the unique single species and family, giant panda is highly significant in taxonomy.

Giant panda has evolved from the environments of the Tertiary paleo-tropics, through the Quaternary tropic-subtropic, to the environments of alpine subtropic and cool temperate in modern times, exemplifying convincingly the geo-biological process in the latest stage in the development of the earth. It is of extremely high scientific value for studying mammal classification and evolution as well as ancient environment transition.

Giant panda today only lives in a very narrow belt in China including western Sichuan, southwestern Gansu and southern Shaanxi. Having been inscribed as a Class I Protected Animal by the Chinese Government, giant panda has also found its position in the lists of endangered animals under protection of the organization of CITES (Convention on International Trade of Endangered Species) and IUCN (the International Union for the Conservation of Nature and Nature Resource). Furthermore, the WWF (known as World Wildlife Fund in US), when it was founded in 1961, chose the giant panda as the emblem, symbolizing world wildlife protection and natural conservation. Giant panda is not only the "National Treasure" of China, but also the natural heritage of the world. The striking black and white pattern and cuddly shape of the giant panda have endeared it to humanity so that it is the best recognized and most loved of all the earth's wild animals. The key factor to preserve giant panda shall be stressed as the protection of its habitat, to which objective increasing attention has been paid all over the world.

According to the study in 1980s, giant pandas are distributed in 34 counties in China, and out of which 28 counties are located in Sichuan. Of the 13 900 km^2 of area of the giant panda habitats,11 680 km^2, 84% of the total is in Sichuan. The joint investigation conducted by the Ministry of Forest. PRC and WWF showed that the number of giant panda is 1 112 ± 240 in China, including 907 ± 196 in Sichuan, 109 ± 23 in Shanxi, and 96 ± 21 in Gansu. Sharing 82% of the total population, Sichuan is necessarily to be the mainframe of giant panda habitat and population.

The nominated area and its giant panda population are characterized by the following features:

The largest, most extensive and most completely representative remaining portion of the habitat of the Giant Panda out of the six mountain systems still containing wild pandas

It has the largest connected area of occupied panda habitat in Sichuan, the largest area of suitable 'potential' habitat for giant panda, is less fragmented than other mountain ranges, has a wider range of panda habitat sub-types in terms of altitudinal zones and bamboo species, is better protected than other mountain ranges, has less human pressure and higher reported density of pandas. According to the preliminary result from the third general survey on giant pandas in China, there are more than 400 giant pandas living in the nominated area, which takes 40% of the total giant panda population and 35% of the total habitat in Sichuan.

A major source for the pandas in zoos and breeding centers

Since 1955 there had been, 148 giant pandas taken into 22 major domestic zoos or breeding centers. In addition, giant pandas from the nominated area have supplied over 50 zoos in 26 counties in the world, some as "state gifts". In the meantime, there have been 212 golden monkeys, 281 takins, 50 Chinese monal, 41 red pandas and 600 other rare and precious animals taken from the nominated area for exhibition or research both at home and abroad. So the nominated area has made a special contribution to the international cooperation, public education, and scientific research.

Site of the original discovery of giant panda, dove tree, and unprecedented numbers of type specimens from scientific exploration

Giant panda made its first appearance to the scientific world in 1869 when Pere Armand David, a French missionary and naturalist then in China, collected 4 giant pandas in Dengchigou of Baoxing County. He made the giant pandas as specimens and showed them at the Paris Museum of Natural History in the same year, and gave a report in the museum bulletin. David was also the first to collect the famous and beautiful dove tree in 1871. This was eventually named in his honour as Davidia involucrata by H.E.Baillon. In additon, the nominated area has proved a 'goldmine' in terms of biological discovery. Pere Armand David also discovered 65 birds new to science and also large numbers of new plants, mammals and insects in 19th century. Many of these were discovered within the nominated area. Subsequent explorations have continued to yield an amazing list of new plants, amphibia and other creatures. Protection of such an important type-collecting locality is of enormous biological importance. There are many type species discovered in the nominated area, including

32 mammals, 43 birds, 7 fish and amphibia and 110 higher plants.

1.2.2 Home of many relict species and 'living fossils'

Both of single species representatives of their lines with long evolutionary histories, living in an ancient forest with many other primitive plants and animals, giant panda and dove tree in the nominated area are often referred to as 'living fossils'. The nominated area is also home to great many more living fossils trapped in Central China as the great forests around the humid Tethys dried out as the sea disappeared with the rising of the Qinghai-Tibetan Plateau.

Of 50~60 monotypic genera (43 in Dujiangyan alone) or living fossils from the Tertiary period known from the area include the ancient tree *Duyecao* or *Kingdonia uniflora, Dipteronia sinensis, Bretschneidera sinensis, Cercidiphyllum japonicum, Tetracentron sinensis* and even a 'living fossil' beetle *Amphizoa davidi* originated from the Triassic Era. In addition the gingko tree *Gingko biloba* has been planted through the area for some centuries and recently the dawn redwood *Metasequoia glyptostroboides* has been extensively introduced around the site.

1.2.3 Globally richest documented botanical site outside of the tropical region

The total flora of the nominated area is estimated to be in excess of 5 000 species of which more than 4 000 are flowering plants. This number is comparable to the entire flora of France! It is the richest botanical site documented in the temperate region or indeed anywhere outside of the tropical rain forests. The nominated area falls into top 25 Biodiversity Hotspots selected by CI (Conservation International) and "Global 200" ecoregions defined by WWF.

Richness is conspicuous for the large size, wide altitudinal range and ecological completeness of the site combined with its special phyto-geo-graphical location and the fact that the site is a classical refuge where the decimating action of repeated oscillations from dry cold and hot wet climates during the Pleistocene could be survived by the rich flora because the high plateau wall to the west created a moisture trap that remained humid even in the driest periods and the relief is so steep that changes in world temperature could be easily accommodated by tiny lateral shifts in location by plants through that turbulent era (WWF/MOF, 1989).

Special attention has been drawn to the norminated area because it also has:

Long lists of endangered and endemic species of almost all taxa

Not only is the nomination area characterized by great richness in numbers of species, but also these contain high levels of national and regional endemics, as well as large numbers of species already labeled as threatened and in urgent need of protection. For instance, of the more than 1000 plant genera recorded from the site more than 50 are endemic to China representing c. 20% of all

endemic Chinese genera. At the species level 60 ~ 70 % of plants are endemic to China. Tables in the proposal and annexes list important endemic and endangered species for plants, birds, and mammals and endangered fish, amphibians and insects.

Diversity for rhododendrons and other plant groups, major source of seeds that form the foundation of 'English' and Western gardens

The nominated area is also a significant global diversity center for many plant groups such as roses, peonies, magnolias, maples, primroses, bamboos and rhododendrons. More than 100 species of rhododendron are listed for the area. This is more than known from some whole countries (Nepal, Bhutan) in the Eastern Himalayan Hotspot, a place per se is famous for its diversity of rhododendrons. Since 19th century, western explorers and collectors had travelled extensively in the Qionglai Mountains. Famous British botanist E. Wilson, alone, had shipped 30 tons of plant seeds to England. The resulting plants transformed the development of horticulture in Europe to such an extent that to this day a disproportionate number of species used in classical 'English' landscape gardens are Chinese species. Edinburgh Royal Botanic Garden in UK has introduced more than 50 species of Rhododendron from this site.

Most important genepool area for Chinese traditional medicine

The nominated area remains a major source and genepool for plants used for traditional Chinese medicine (TCM). Several hundred local species have been collected and used for medicine and many of these are now rare and endangered such as the orchid *Gastroidea elata*, alpine fritillaries and caterpillar fungus *Cordyceps sinensis*. Preservation of these species is essential for the conservation of these valuable natural resources, for the cultural importance of TCM and because of their potential in future pharmaceutical research.

Richest and lushest alpine flora in the world

Alpine botanists (Wilson, 1916; Baron, 1987) recognized the alpine flora of the nominated area as being probably the richest and lushest example of its type in the world. The number of different species found per unit area and the luxuriance of forms are astonishing. On the Balangshan, several dozen species of flowers can be identified within a few square metres. The unusual wet cloudy Sichuan summer weather is in complete contrast to almost all other alpine zones, where dry, exposed summers are typical. This nominated area lies within the Western China rain trap and the added moisture has helped to protect the floral richness as a Pleistocene refuge and to create endemism.

A complete continuum from permanent ice to evergreen subtropical forests

Only two sites in Central China offer a protected spectrum of natural vegetation zones from permanent icefields, through alpine, subalpine, temperate mixed forests and down to subtropical evergreen broad-leaved forests. One is the nominated area and the second is the Mt. Gongga Glacier Reserve in southwestern Sichuan. The latter area lacks giant panda.

Vertical vegetation zones

The highest peak of the nominated area is the Mt. Siguniang at 6250 m.a.s.l. The lowest point is in Dujiangyan at 600 m.a.s.l. The zonation and composition of different zones vary at different locations but can be summarized as followings:

600 ~ 1800 m: Subtropical montane evergreen broad-leaved forest.
1800 ~ 2400 m: Subtropical montane evergreen and deciduous broad-leaved mixed forest.
2400 ~ 2800 m: Warm extrotropical alpine coniferous and deciduous broad-leaved mixed forest.
2800 ~ 3800 m: Cool extrotropical subalpine coniferous forest.
3800 ~ 4400 m: Subfrigid alpine scrub and meadows.
4400 ~ 4500 m: Frigid alpine screes and sparse vegetation.
Above 5000 m: Permanent ice and snow.

Diversified ecotypes

A large number of different ecotypes are recognized. For instance the Wolong vegetation could be divided into 5 groups, 15 types, 39 formation groups and 69 formations.

Important area for protection of rare and endangered species

About 67 species of state protection plants are found in the nominated area. The plants under Class I of state protection include 8 species such as dove tree, (*Davidia involucrate*), The plants under Class II of state protection include 40 species such as Minjiang cypress (*Cupressus chengiana*). The plants under Class III of state protection include 19 species such as sargent spruce (*Picea brachytyla*).

Plants listed under state protection in the nominated area

No	English name	Scientific name	CPWP(1999)	CREPP(1980)
1	Chinese cystoathyrium	*Cystoathyrium chinensis*	1	2
2	Ginkgo	*Ginkgo biloba*	1	2
3	Chinese yew	*Taxus chinensis*	1	
4	Marie yew	*Taxus chinensis* var. *mairei*	1	
5	Dove tree	*Davidia involucrata*	1	1
6	Vilmorin dove tree	*Davidia involucrata* var. *vilmoriniana*	1	2
7	Oneflower kingdonia	*Kingdonia uniflora*	1	2
8	Chinese bretschneidera	*Bretschneidera sinensis*	1	2
9	Palmate neocheiropteris	*Neocheiropteris palmatopedata*	2	
10	Chinese fern	*Sinopteris grevilleoides*	2	2
11	Scythian lamb	*Cibotium barometz*		2
12	Oliver plumyew	*Cephalotaxus oliveri*	2	2
13	Cheng cypress	*Cupressus chengiana*	2	2
14	Masters larch	*Larix mastersiana*	2	2
15	Graybark spruce	*Picea brachytyla* var *complanata*	2	
16	Bigcone spruce	*Picea neoveitchii*	2	
17	Farges torreya	*Torreya fargesii*	2	
18	Bracleate acanthochlamys	*Acanthochlamys bracteata*	2	
19	Catalpa maple	*Aecr catalpifolium*	2	3

20	Katsuratree	*Cercidiphyllum japonicum*		2
21	Szechuan peony	*Paeonia szechuanica*	2	2
22	Eucommia	*Eucommia ulmoides*	2	2
23	Zhennan	*Phoebe zhennan*	2	3
24	Wild soybean	*Glycine soja*	2	3
25	Hosie ormosia	*Ormosia hosiei*	2	
26	Chinese tuliptree	*Liriodendron chinense*	2	2
27	Officinal magnolia	*Magnolia officinalis*	2	3
28	Magnolia	*Magnolia sinensis*	2	3
29	Wilson magnolia	*Magnoila wilsonii*	2	3
30	Wilsonii michelia	*Michelia wilsonii*	2	2
31	Tetracentron	*Tetracentron sinense*		2
32	Chinese toona	*Toona ciliata*	2	3
33	Field circaeaster	*Circaeaster agrestis*	2	2
34	Slender anisachne	*Anisachne gracilis*	2	
35	Short-awn wildryegrass	*Elymus brviaristatus*	2	
36	Awnless wildryegrass	*Elymus submuticus*	2	
37	Camphor tree campher wood	*Cinnamomum camphora*	2	
38	Langpaniculate cinnamom	*Cinnamomum longepaniculatum*	2	
39	Nanmu yunnan phoebe	*Machilus nanmu*	2	
40	Redflower meconopsis	*Meconopsis punicea*	2	
41	Common pomatosace	*Pomatosace filocula*	2	
42	Henry emmenopterys	*Emmenopterys henryi*	2	2
43	Chinese corktree	*Phellodendron chinense*	2	
44	Common rockycabbage	*Triaenophora rupestris*	2	
45	Tangut anisodus	*Anisodus tanguticus*	2	
46	Amur linden	*Tilia amurensis*	2	
47	Tong-chong-ha-cho	*Cordyceps sinensis*	2	
48	Matsutake mushroom	*Tricholoma matsutake*	2	
49	Chinese hazelnut	*Corylus chinensis*		3
50	Glabrousleaf epaulettetree	*Pterostyrax psilophyllus*		3
51	Silveryleaf cassia	*Cinnamomum mairei*		3
52	Tschonosk trillium	*Trillium tschonoskii*		3
53	Pinnateleaf lilac	*Syringa pinnatifolia*		3
54	Mangseeded euptelea	*Euptelea pleiospermum*		3
55	Padus grayana	*Prunus grayana*		3
56	Chinese money maple	*Dipteronia sinensis*		3
57	Swollennoded cane	*Qiongzhuea tumidinosa*		3
58	Chinese may-apple	*Sinopodophyllum emodi*		3
59	Chinese falsepistache	*Tapiscia sinensis*		3
60	Chinese goldthread	*Coptis chinensis*		3
61	Many-flowered may-apple	*Dysosma versipellis*		3
62	Tall gastrodia	*Gastrodia elata*		3
63	Sargent magnoila	*Magnoila sargentiana*		3
64	Sargent spruce	*Picea brachytyla*		3
65	Soft leather leaves rhododendron	*Rhododendron alutaceum*		3
66	King rhododendron	*Rhododendron rex*		3
67	Footcatkin willow	*Salix magnifica*		3

Abundance in endemic species and genera in addition to mono-species, rare-species families and genera

The nominated area falls towards the northern end of the West Sichuan-Northwest Yunnan Center, one of China's three main centers of floral endemism, with a large quantity of plant genera and species. There are many gymnosperms, such as the genera of ginkgo (*Ginkgo biloba*) Chinese fir (*Cunninghamia*) and the dawn redwood (*Metasequioa*); dicotyledons, such as *Dipteronia, Clematoclethra, Notopterygium, Nannoglottis, Notoseris, Sinacalia, Sinojohnstonia, Dysosma, Bretschneidera,* dove tree (*Davidia*), *Berneuxia, Eucommia, Hanceola, Heterolamium, Kinostemon, Sinofranchetia, Camptothec, Asteropyrum, Beesia, Kingdonia, Emmenopterys, Sargentodoxa* and *Triaenophora*, and monocotyledons, such as the bamboos *Bashania* and *Qiongzhuea*. The total number of the endemic genera here amounts to over 50, accounting for 20% of the total endemic genera in China. This rare phenomenon shows that this area is ecologically quite favorable for the growth and evolution of wild plants.

The above table lists the plants for protection, most of which are endemic species of China. These endemic genera and species origined from ancient time, and are unique plants of system evolution. Emerged first in the Tertiary, Jurassic or even earlier periods, for example, are those primitive plants, including *Eucommia, Dysosma, Acer catalpifolium, Magnolia sinensis, Magnolia wilsonii, Michelia wilsonii, Rhododendron alutaceum,* and the plants of mono-species and rare species, including ginkgo, dove tree, *Dipteronia sinensis, Bretschneidera sinensis,* and *Cercidiphyllum japonicum.* Plants of *Ginkgo biloba* emerged in later Palaeozoic, boomed in the Jurassic Period and degenerated suddenly in the Cretaceous Period, of which only one species and one genus exist now. It is distributed over a large area in the Mt. Erlang in the nominated area. Plants of *Davidia* emerged in the Tertiary, and there were a great number all over the world in the middle of the Quaternary, but now there is only one mutation, one species and one genus, distributed over a large area in the nominated area. The nominated area is the place with dense distribution of the China's endemic plants, a few survivors from evolution. The representatives are dove tree and ginkgo. Dove tree, *Bretschneidera sinensis*, and *Cercidiphyllum japonicum* are the most important components of the ancient tropical plants from the Tertiary Period.

In the nominsted area, about 76 rare-species genera have been found, such as *Dipteronia, Euptelea* and *Kinostemon*; 36 mono-species genera such as *Emmeopterys, Sinofranchetia* and *Moneses;* and 15 endemic mono-species genera such as *Davidia involucrata, Tetracentron sinense* and *Cercidiphyllum japonicum*, accounting for 41.67% of the total endemic genera.

1.2.4 Important area for conservation of wild fauna

The nominated area is located in the China-Indian subtropical system, at the intersection of the palaearctic region, which transits towards the Hengduan Mountain system to the Oriental region to the south. The fauna can be calssified as belonging to the subtropical forest of the east marginal

mountains, and includes animal groups of the subtropical broad-leaved forests, coniferous forests of westen Sichuan mountains and also the animals in the alpine shrubbery and meadow on the Qinghai-Tibet Plateau. The fauna is thus a mixture of northern species of the Palaearctic realm, mostly distributed in the alpine and coniferous and temperate forest zones, with animals of the Oriental realm, mostly distributed in the subtropical evergreen broad-leaved zone, with regional endemics found at various levels in the transition zone.

There are 542 species of vertebrates and 1 700 species of insects (still very incompletely studied) among the known wild animals in the nominated area. Among the vertebrates there are 109 species of mammals in 25 families, accounting for 50% of the mammals in Sichuan and 20.5% in China; 365 species of birds in 45 families, accounting for 68% of the birds in Sichuan; 32 species of reptiles in 9 families, 22 species of amphibians in 8 families, 14 species of fishes in 5 families.

The wild fauna, influenced by landscape and vegetation, has the following important features:

Altitudinal zonation

The altitudinal or vertical zonality of animal species is conspicuous in the nominated area. Dominating in zones of elevation 1 000 m ~ 2 200 m with evergreen and deciduous broad-leaved mixed forest are tropic and subtropical animals of South China and Southeast Asia, such as Japanese forest frog, Polypedates megacephalys, gem-faced Indian Civet (*Paguma larvata*), (*Sphenomorphus*), *Rhabdophis nuchalis, Hwamei* (*Garrulax canorus canorus*), gem-faced civet (*Paguma larvata*), large Indian civet (*Veverra zibetha ashtoni*), *Muntiacus reevesi, Elaphodus cephalophus* and samber (*Cervus unicolor*). Dominating in the range of 2200 m ~ 3600 m with coniferous-broad-leaved-mixed forest and coniferous forest are animal types of the Hengduan-Himalayan Mountain, such as *Staurois loloensis*, blood pheasant (*Ithaginis cruentus geoffroyi*), Temminck's tragopan (*Tragopan temminckii*), Elliot's laughing thrush (*Garrulax ellioti*), golden monkey, giant panda, red panda and Takin of China or Sichuan endemic species. Above flowstone slope 3600 m is dominated by mountain animals, such as *Lerwa lerwa, Tetraophasis obscurus*, Chinese monal, blue sheep (*Pseudois nayaur*), snow leopard (*uncia uncia*) and musk deer (*Moschus* spp.). The giant panda itself shows modest changes in altitude feeding on the lower zones of its range in the winter and moving up into the rich arrow bamboo zone in summer. Fortunately for the panda, its food, the bamboo is evergreen. Green leaves are available all through the winter and richer young shoots and stems can be eaten in the spring and summer.

Abundance of endangered species

Among the known 86 species of animals under state protection, there are 16 species of animals belonging to class I of state protection, 62 species of animals belonging to Class II of state protection, and 8 species of animals belonging to provincial level protection. Rare protected butterflies are sub-tropical birdwings *Troides aecus* and *T. helena*, Temperate forest *Taeniopalpus imperialis, Bhutanitis* (*Sinonitis*) *thaidana*, the endemics *Bhutanitis moupinensis* and *Bhutanitis nigrilima*, and alpine Apollo butterflies *Parnassus jacquemontii, P. epaphus, P. tianschanicus, P. nomion, P.*

stubbendorfii, P. glacialis, P. orleans, P. szechenyii, P. cephalus, P. przewalskii, P. baileyi, P.acdestis, P. imperator, P. simio and P. andreji. The list of protected species occurring in the nomination area is given in the table below.

List of special protected wild animals in the nominated area

No.	Name	Scientific Name	Protection Class		
			China protection	CITES	IUCN
1	Golden monkey	*Rhinopithecus roxellana*	1	Annex I	VU
2	Giant panda	*Ailuropoda melanoleuca*	1	Annex I	EN
3	Snow leopard	*Panthera uncia*	1	Annex I	EN
4	Leopard	*Panthera pardus*	1	Annex I	
5	Clouded leopard	*Neofelis nebulosa*	1	Annex I	VU
6	White-lipped deer	*Cervus albirostris*	1		VU
7	Takin	*Budorcas taxicolor*	1	Annex II	R
8	Black stork	*Ciconia nigra*	1	Annex II	
9	Pallas's sea eagle	*Haliaeetus leucoryphus*	1	Annex II	R
10	White-tailed sea eagle	*Haliaeetus albicilla*	1	Annex I	VU
11	Golden eagle	*Aquila chrysaetos*	1	Annex II	
12	Bearded vulture	*Gypaetus barbatus*	1	Annex II	
13	Chinese hazel grouse	*Tetrastes sewerzowi*	1		
14	Pheasant grouse	*Tetraophasis obscurus*	1		
15	Chinese monal	*Lophophorus thuysii*	1	Annex I	EN
16	Black-necked crane	*Grus nigricollis*	1	Annex I	VU
17	Rhesus macaque	*Macaca mulatta*	2	Annex II	
18	Chinese stump-tailed macaque	*Macaca thibetana*	2	Annex II	
19	Dhole	*Cuon alpinus*	2	Annex II	VU
20	Brown bear	*Ursus actos pruinosus*	2	Annex I	
21	Asiatic black bear	*Selenarctos thibetanus*	2	Annex I	VU
22	Red panda	*Ailurus fulgens*	2	Annex II	EN
23	Stone marten	*Martes foina*	2	Annex III	
24	Yellow-throated marten	*Martes flavigula*	2	Annex III	
25	Common otter	*Lutra lutra*	2	Annex I	
26	Large indian civet	*Viverra zibetha*	2	Annex III	
27	Indian civet	*Viverricula indica*	2	Annex III	
28	Spotted linsang	*Prionodon pardicolor*	2	Annex I	
29	Golden cat	*Felis temmincki*	2	Annex I	
30	Palla's cat	*Felis manul*	2	Annex II	
31	Lynx	*Lynx lynx*	2	Annex II	
32	Chinese forest musk deer	*Moschus berezovskii*	2	Annex II	
33	Roan musk deer	*Moschus sifanicus*	2	Annex II	
34	Red deer	*Cervus elaphus*	2		
35	Wapti	*Cervus elaphus macneilli*	2		
36	Samber	*Cervus unicolor*	2		
37	Tibetan gazelle	*Procapra picticaudata*	2		
38	Serow	*Capricornis sumatraensis*	2	Annex I	VU
39	Goral	*Naemorhedus goral*	2	Annex I	VU
40	Argali sheep	*Ovis ammon*	2	Annex II	VU
41	Blue sheep	*Pseudois nayaur*	2		
42	Mandarin duck	*Aix galericulata*	2		

43	Buteo	*Buteo buteo*	2		
44	Kite	*Milvus korschun*	2		
45	Sparrow hawk	*Accipiter gentilis*	2		
46	Goshawk	*Accipiter nisus*	2		
47	Pine grosbeak	*Accipiter virgatus*	2		
48	Cinereous vulture	*Aegypius monachus*	2	Annex II	V U
49	Greater spotted eagle	*Aquila clanga*	2	Annex II	
50	Brown-backed falcon	*Falco columbarius*	2		
51	Red falcon	*Falco tinnunculus*	2	Annex II	
52	Red-food falcon	*Falco vespertinus*	2		
53	Snow partridge	*Lerwa lerwa*	2		
54	Blood pheasant	*Ithaginis cruentus*	2		
55	Red-bellied tragopan	*Tragopan temminckii*	2		
56	Elwe's eared pheasant	*Crossoptilon harmani*	2	Annex I	
57	Tibetan eared pheasant	*Crossoptilon crossoptilon*	2	Annex I	V U
58	Blue eared pheasant	*Crossoptilon auritum*	2		
59	Koklos pheasant	*Pucrasia macrolopha*	2		
60	Golden pheasant	*Chrysolophus pictus*	2		
61	Chinese copper pheasant	*Chrysolophus amherstiae*	2		
62	Grey crane	*Grus grus*	2		
63	Wedge-tailed green pigeon	*Treron sphenura*	2		
64	Derbyan parakeet	*Psittacula derbiana*	2		
65	Collared scops owl	*Otus bakkamoena*	2		
66	Eagle owl	*Bubo bubo*	2	Annex II	
67	Forest eagle owl	*Bubo nipalensis*	2	Annex II	
68	Little owl	*Athene noctua*	2		
69	Tawny owl	*Strix aluco*	2		
70	Ural wood owl	*Strix uralensis*	2		
71	Barred owlet	*Glaucidium cuculoides*	2		
72	Collared scops owl	*Glaucidium brodiei*	2		
73	Chinese giant salamander	*Andrias davidianus*	2	Annex I	
74	Trout	*Hucho bleekeri*	2		
75	Carabus lafossei	*Carabus lafossei*	2		
76	Cheirotonus	*Cheirotonus gestroi*	2		
77	Apollo butterflies	*Bhutanitis thaidina dongchuanensis*	2		
78	Bhutanitis butterfly	*Parnassius apollo*	2		
79	Common red fox	*Vulpes vulpes*	3		
80	Alpine weasel	*Mustela altaica*	3	Annex III	
81	Leopard cat	*Felis bengalensis*	3	Annex I	
82	Tufted deer	*Elaphodus cephalophus*	3		
83	Red flying squirrel	*Petaurista petaurista*	3		
84	Owl	*Caprimulgaus indicus jataka*	3		
85	Large hawk cuckoo	*Cuculus sparverioides*	3		
86	Swift	*Hirundapus caudacutus*	3		

Notes:

1) According to the state protection of China. The animals of class-I and class-II are under state key protection, and animals of class-III protection in Sichuan are under provincial key protection.

2) CITES: Convection on International Trade of Endangered Species, 1995.

3) IUCN: International Union for Conservation of Nature and Natural Resources, 1994, EN endangered species, VU vulnerable species, R rare speesci

High levels of endemism

Chinese and Sichuan endemic species in the nominated area include mammals such as giant panda, golden monkey, takin, white-lipped deer and Chinese stump-tailed macaque, birds such as Chinese monal, Orange-throated partridge (*Tetrophasis obscurus*), Chinese Thrush (*Turdus mupinensis*) and Rufous-tailed babbler (*Chrysomma poecilotis*), amphibians such as *Oreolalax popei, Amolops mantzorum, Staurois mantzorum* and *Polypedates dugritei, fishes* such as *Schizopygopsis malcanthus, Baoxinggensis, Schizothorax* (*Schizop.*) and trout (*Hache beekeri*), and half of the reptiles are endemic species such as *Japalura szechwanensis, Achalinus meiguensis, Leiolopisma monticola,* and *Pareas chinensis. Amphizoa davidi* grows only in the Jiajin Mountains of Baoxing County. In 1870 a specimen of male worm was collected which was generally thought of as extinct. In 1995 its imago and larvae were found again at the original place, showing that the original state of ecological environment was preserved well at the habitat.

Analysis of the global distributions of birds with resticted ranges undertaken by ICBP (now called BirdLife International) identified globally more than 400 EBA's or endemic bird areas where the ranges of several restricted range birds overlap. 13 of these EBAs are in China and 2 fall within the nominated area, which contain many of the most interesting and endangered endemic birds of China.

Global center of pheasants and important site for China's endemic birds

The nominated area is a special center of endemism for some bird taxa such as leaf warblers, laughingthrushes, rosefinches and pheasants. China is recognized as the global center of pheasant diversity with a total of 63 species. The nominated area contains a total of 15-16 different pheasant species; more than those known form any other single site.

Pheasant species of the nominated area

Snow partridge	*Lerwa lerwa*
Tibetan snowcock	*Tetraogallus tibetanus*
Orange-throated partridge	*Tetraophasis obscurus*
Tibetan partridge	*Perdix hodgsoniae (marginal)*
Chinese bamboo partridge	*Bambusicola thoracica*
Blood pheasant	*Ithaginis cruentatus*
Temminck's tragopan	*Tragopan temminckii*
Koklass pheasant	*Pucrasia macrolopha*
Chinese monal	*Lophophorus lhuysii*
Silver pheasant	*Lophura nyctymene*
White-eared pheasant	*Crossoptilon crossoptilon*
Common pheasant	*Phasianus colchicus*
Golden pheasant	*Chrysolophus pictus*
Lady amherst's pheasant	*Chrysolophus amherstiae*
Chinese grouse	*Tetrastes sewerzowi*
Japanese quail	*Coturnix japonicus*

Most important region of China for mammalian conservation

The most important region in China for mammal conservation consists of the band of forests on the eastern side of the Qinghai-Tibetan Plateau, extending through western Sichuan to southern Shaanxi and southwestern Hubei. This is the home of many of China's most precious and endangered species including giant panda, red panda, takin, musk deer, golden monkey and many others (MacKinnon et al, 1996). Within this zone the nominated area is the single site with the greatest representation of these important mammals. Cluster analysis by known distribution at county level or by biophysical sub-divisions (Xie Yan, 2001, 2002) confirms this importance and identifies the counties of Wenchuan, Kanding, Tianquan, Luding and Lixian as of particular importance.

1.2.5 Important ecological service functions

Based on the satellite image analysis, 53% of the area is natural forest [39% conifer zone (reddish shade on satellite photo), 14% subtropical zone], 36% is alpine shrub and grassland above the treeline, 8% is bare rock and ice at very high altitude and only 3% of the area is agricultural lands used for traditional hill farming. All the alpine shrub/grassland zone is connected and most of the forest is continuously connected. This is important in preserving the ecological integrity of the site, allowing vertical seasonal migrations and preserving large outbreeding populations.

Due to the location of the nominated area in the upper reaches of the Yangtze River, improved protection of the forest ecosystems is of enormous importance to China's economy. About one quarter of the entire population of China live downstream of the catchment area or are dependent on water and electricity diverted from the Yangtze River via the Three Gorges and Gezhouba dams. The lives of almost 300 million people are therefore affected by the success or failure of the catchment. Good protection means more reliable water supply, better supply of electricity, better flood control and better river communications. Poor protection means more frequent and severe floods, water shortages, siltation of canals and irrigation systems and loss of inland fisheries.

At a more local scale, the nomination of the area as a world heritage site will affect the levels of investment in eco-tourist infrastructure and protective management, providing important revenues to the local people whose support and collaboration are so vital to the programme's success.

1.3 Site of great biological history significance

The nominated area has been of great significance in the history of the study of biology for over 130 years. Highlights include the early explorations and collections of Pere Armand David in the late 19th century, the further botanical explorations and collections by Wilson in the early years of the 20th century, the highly respected studies of the fauna by Chinese academics such as Hu Jinchu and flora by Wu Zhengyi, Fang Wenpei, extending into the pioneering research on giant panda ranging ecology and breeding biology initiated in 1981 by the unique and politically significant collabora-

tion between international and Chinese scientists (Schaller et al., 1985) and continuing research into the 21st century.

Provincial research teams started work in the area during the 1960s. The famous field station of Wuyipeng in the home of the giant panda at an altitude of 2 400m was established in 1979 and has been the site of continuous field studies ever since. This is one of the longest such studies of a mountain system of this type.

Wolong and Labahe nature reserves were among the first batch of nature reserves established in China in 1963 and apart from the Guangdong MAB reserve of Dinghushan (established in 1956), these areas have the longest history and greatest experience in conservation and protected area management in China.

1.4 Largest and most successful captive breeding center of giant panda in the world

The Wolong Breeding Center at Hetaoping is the world's largest and most successful captive breeding center for giant panda. Here is found the largest collection of captive pandas and here has been the greatest number of successful captive births. 48 cubs were born there between 1986 and 2000. The unique feature of this center is that it is situated right inside the natural habitat of the species and has a large walled natural enclosure (2 ha) where animals can perform more natural life activities than in any other captive station.

1.5 Spectacular scenic area

The natural scenery of the nominated area is outstanding with steep forested valleys, clear rushing rivers, rocky crags, wide alpine meadows and the backdrop of the shy glacial peaks of Mt. Siguniang. There are eerie freshwater lakes and splendid examples of glacial landscapes. The entire scene is constantly changing with the season-icicles and snowy cushions in winter, carpets of flowers in the deciduous forests in spring, a blaze of alpine color in summer, stunning red leaves in fall and the elegant plumes of bamboo all year round. Strange mists swirl around the crags or settle in the valleys.

More than 20 special scenic areas have been specifically identified, with each possessing its own unique characters and features. Among them, the most famous ones are listed below:

Scenic and Touristic Resources in the nominated area

No.	Scenic Spot	Landscape Features	Present level of Development
1	**Wolong National Nature Reserve Museum at Shawan**	One of the best places for science and education, having numerous local species of 2 170 plants, 225 birds, 56 beast, 700 insect, 6 fish, 17 amphibians and reptites.	Started
2	**Yingchanggou in Wolong National Nature Reserve**	High peaks embraced by clouds and mist, big trees and rushing water in valleys, with extra interest from travelling pandas.	Started
3	**Wolong Hetaoping Giant Panda Breeding Centre**	Six labs and quarters for up to 55 pandas, an ideal place for panda study. Visitors can see pandas in pens and a large outdoor enclosure.	Started
4	**Shangjiang Scenic Spot of Wolong National Nature Reserve**	Wonderful forest with dove trees and wild animals, such as Sambers	Started
5	**Muerzhai Forest Park of Mt. Siguniang National Nature Reserve**	Wonderful subalpine forest and alpine meadow	To be developed
6	**Changpinggou Scenic Spot of Mt. Siguniang National Park**	Along a path entering through the dense cypresses of thousands of years that form a huge umbrella, making people difficult to distinguish the sunrise from the sunset	Started
7	**Shuangqiaogou Scenic Spot of Mt. Siguniang National Park**	Wonderful subalpine forest by *Hippophae* and snow peaks	Started
8	**Haizigou Scenic Spot in Mt Siguniang National Park**	Located in the east of Rilong town, named after its consisting of lots of lakes, 19.2 km long and 126.48 km^2 in area, with tranquil and clear water in which fishes swim and over which eagles soar in the blue sky.	To be developed
9	**Red-leaf Scenic Spot of Miyalou Provincial Park**	With National Road 317 running through, as the largest red-leaf spot in China at 2000 ~ 3400 m a.s.l., it extends 127 km and covers an area of 3 000 km^2 with clean waters, green maintains and trees, a red corridor is formed among the trees in golden autumn.	Started
10	**Bipenggou Scenic Spot of Miyalao Provincial Park**	45 km long, covering an area of 180 km^2 and at 2000 ~ 5000 m a.s.l., adjacent to Mt. Siguniang, Bipenggou is a scenic collection of plateau, swamps and valleys, featured by the well-known "Eight Wonders": ancient glaciers, lakes, springs, waterfalls, forests, peaks, red leaves and swamps. The resort covers varieties of red leaves and Rhododendron, with the intersections of glaciers, waterfalls and perilous peaks. In addition to its primitively ecological environments, its abundance of resources of natural landscapes and wildlife has made it an ideal resort for eco-tourism and scientific education in the 21st century.	Started
11	**Caopo Provincial Nature Reserve**	Scenery of ecosystem for giant panda, primitive forest and wild animals.	To be developed
12	**Fengtongzhai National Nature Reserve**	Scenery of ecosystem for giant panda, primitive forest and wild animals, with dense distribution of giant panda and golden monkey.	Started
13	**Mt. Jiajin Scenic Spot of Mt. Jiajin Provincial Park**	Scenery of ecosystem for giant panda, snowy mountain, Tibet villages and Tibet customs, commemorate places of the Chinese Red Army cross over the snow-capped mountain on foot.	To be developed
14	**Pujigou Scenic Spot of Mt. Jiajin Provincial Park**	Scenery of ecosystem for giant panda, primitive forest, wild animals and snow-capped mountain.	To be developed
15	**Ganyanggou Scenic Spot of Mt. Jiajin Provincial Park**	Scenery of ecosystem for giant panda, wild osmanthus, primitive forest, wild animals, gorges, with rare scenery of 600m^2 of wild osmanthus forest	To be developed
16	**Dengchigou Catholic Church of Mt. Jiajin Provincial Park**	Constructed in Qing Dynasty in Baoxing County in 1839, Covering an area of 1 560 m^2, with features of Chinese quadrangle and French style, by the French natural historian P. A. David who then became the father of this church and found giant panda in 1869 at this place. The architecture is intact and the church is the place for catholics in Baoxing County to have their activities.	To be developed
17	**Labahe Provincial Nature Reserve**	Scenery of ecosystem for giant panda, primitive forest wild animals, snow-capped mountain, with dense distribution of takin, deer and monkey. Good place to watch takin visiting salt licks in open area.	Started
18	**Baishahe Scenic Spot of Mt. Erlang Provincial Park**	Attractive scenery of ecosystem for giant panda, primitive forest, wild animals and deep gorges.	To be developed
19	**Mt. Erlang and Mt. Hongling Scenic Spot of Mt. Erlang Provincial Park**	Stunning scenery of ecosystem for giant panda, primitive forest, wild animals, snow-capped mountain, with rare scenery of dove trees of 200 000 m long and ginkgo of hundreds of acres.	To be developed

20	**Mt. Daxuefeng Scenic Spot of Mt. Lingjiu—Mt. Daxuefeng Provincial Park**	Beautiful scenery of ecosystem for giant panda, primitive forest, wild animals, snow-capped mountain, glacier, with rare scenery of dense distribution of giant panda, deer and takin.	To be developed
21	**Mt. Qingcheng Scenic Spot of Mt. Qincheng—Dujiangyuan National Park**	Scenic and cultural site. Ecosystem for giant panda, primitive forest, wild animals, with vestiges of Chinese Daoism such as Tianshidong Temple. It is already listed as World Culture Heritage	Partly developed
22	**Houshan Scenic Spot of Mt. Xilingxueshan National Park**	Scenery of ecosystem for giant panda, primitive forest, wild animal, snow-capped mountains.	To be developed
23	**Mt. Jiguan-Jiulonggou Provincial Park**	Scenery of ecosystem for giant panda, primitive forest, wild animals	Partly developed
24	**Mt. Tiantai Provincial Park**	Scenery of ecosystem for giant panda, landscapes and various bamboos.	Partly developed
25	**Jingtang -Kongyu Provincial Nature Reserve**	Scenery of ecosystem for giant panda, primitive forest, wild animals, subalpine meadow, ancient path for transporting tea and salt to Tibetan and Commemorations for the Chinese Red Army s Long March	To be developed

1.6 Additional cultural interests of the Qiang and Tibetan minorities and Han temples, Taoism and historical sites including the unique Qing Dynasty Catholic Mission

The northeastern gateway to the nominated area is the municipal city of Dujiangyuan, famous for its outstanding Taoist temples and famous irrigation works. These have separately, already been recognized as an outstanding cultural area and graced with the title of World Heritage Cultural Site.

Other examples of Han culture can be found in Baoxing and other early settlements in and around the nominated area. The Catholic mission station and church of Dengchigou in Baoxing county remains intact with its unique French/Qing style.

Qiang and Tibetan minorities preserve their own cultural values with distinctive house styles, dress, language, ethnobotanical knowledge, dances, religion, and other traditions.

2 Conservation Status and Pressures Facing the World Heritage

2.1 Conservation status

Wolong and Labahe Reserves were established in 1960's, among the ones first set up in China. Another 7 reserves and 9 scenic parks were also set up later. The legislation applied in nature reserves is the "Management Regulations on Nature Reserves" and in scenic parks the "Management Regulations on Scenic and Historical Parks (Areas)". Since 1980's, both the State Council and Sichuan Province issued Wildlife Protection Law or Regulation. Many counties in the region applied hunting ban.

Since 1979, international collaborations have been initiated in the nominated area, especially on giant panda. Among them the longest one is the collaborative project on giant panda conservation with WWF. Based on such project, a National Conservation Program on Giant Panda and Its Habitat was formed in 1989 and later approved by the State Council in 1993.

In 1999, the National Natural Forest Protection Program (NFPP) was launched with a logging ban, eliminating the major threats to habitat degradation and fragmentation. In year 2000, the Program on Conversion of Slopping Cultivated Land to Forest and Grassland (also known as "Grain to Green") was also initiated. Both Programs presented great potential of restoring damaged panda habitat and recovering biodiversity in a landscape scale. Since 2001 a National Program on Endangered Wildlife and Nature Reserves" has been applied, greatly increased the investment in protecting selected species such as giant panda and golden monkey, as well as in establishing new reserves and expanding existing ones. The following provides a brief description of all 7 nature reserves and 9 scenic parks in the nominated area:

- **Wolong National Nature Reserve** in the nominated area, set up in Wenchuan County in 1963, 200 000 ha, mainly for the protection of golden monkey and giant panda. 100 wild pandas are living there. Tourist accommodation capacity in 2 000 amounted to 60 000 person-time.

- **Labahe Provincial Nature Reserve** in the nominated area, set up in Tianquan County in 1963, 23 400 ha, protecting animals like takin and giant panda. 12 wild pandas are living there. Tourist flow in 2 000 amounted to 3 000 person-time.

- **Fengtongzhai National Nature Reserve** in the nominated area, set up in Baoxing County in 1975, 39 000 ha, mainly protecting giant pandas. 40 wild pandas are living there. Tourist flow in 2 000 amounted to 6 000 person-time.

- **Mt. Qingcheng - Dujiangyan National Park** in the nominated area, set up in Dujiangyan City in 1982, 15 000 ha, mainly protecting Taoist heritage culture of the Qingcheng Mountain, ecosystem and the ancient Dujiangyan Irrigation System. 6 or 8 pandas are living there. Its tourist flow in 2 000 amounted to 400 000 person-time.

- **Mt. Jiguan - Jiulonggou Provincial Park** (including Anzi Provincial Nature Reserve) in the nominated area, with a tourist flow in 2 000 amounted to 100 000 person-time.

- **Mt. Tiantai Provincial Park** in the buffer zone of the nominated area, set up in Qionglai City in 1989, 21 000 ha, mainly protecting the sightseeing ecosystem. 4 or 6 panda are living there. Its tourist flow in 2 000 amounted to 140 000 person-time.

- **Heishuihe Provincial Nature Reserve** in the nominated area, managed by Lushan and Dayi Forestry Bureau and set up in Lushan and Dayi County in 1993, 31 800 ha, mainly protecting giant pandas. About 25 pandas are living there.

- **Mt. Siguniang National Park** in the nominated area, set up in Xiaojin County in 1994, 45 000 ha, mainly protecting the sightseeing ecosystem. Giant pandas were once concentrated in the area.

Its tourist flow in 2 000 amounted to 64 000 person-time.

- **Mt. Xilingxueshan National Park** with the unexploited back mountain in the nominated area, set up in Dayi County in 1994, 48 300ha. Its tourist flow in 2 000 amounted to 200 000 person-time.

- **Mt. Jiajin Provincial Park** dominantly in the nominated area, managed by Construction, Environmental Protection & Travel Bureau of Baoxing County and set up in Baoxing County in 1995, 127 500 ha. About 100 pandas are living there.

- **Miyaluo Provincial Park** (including Miyaluo Provincial Nature Reserve) with the Bipenggou and part of red-leaf scenic areas in the nominated area, set up in Lixian County in 1995, 368 800 ha, protecting the sightseeing ecosystem. An administration of the scenic area was set up. 2 giant pandas were found in 2000.

- **Jintang - Kongyu Provincial Natureal Reserve** dominantly in the nominated area, set up in Lushan County in 1995, 130 000 ha, protecting wild animals and ecosystem, managed by the Construction Bureau of the county. About 10 giant pandas are living there.

- **Mt. Siguniang National Nature Reserve** partly in the mostly area, set up in Xiaojin County in 1996, 130 000 ha, protecting the ecosystem. Giant pandas were found there in 1970s.

- **Mt. Lingjiu - Mt. Daxuefeng Provincial Park** partly in the nominated area, managed by Lushan Construction Bureau and set up in Lushan County in 1999, 30 000 ha, protecting the sightseeing ecosystem. 25 pandas are living in the Mt. Daxuefeng area.

- **Mt. Erlang Provincial Park** in the nominated area, managed by Construction, Environmental Protection & Travel Bureau of Tianquan County and set up in Tianquan County in 2000, 126 000 ha, protecting the sightseeing ecosystem. 23 pandas are living there.

- **Caopo Provincial Nature Reserve** mostly in the nominated area, set up in Wenchuan County in 2000, 55 678 ha, protecting giant panda. About 10 giant pandas are living there.

2.2 Socio-economic status

There are 21 320 people living inside the nominated area, among which 1 020 inhabitats of 260 households are in the core zone and 20 300 in buffer zone, mainly 4 900 in Wolong and Gengda Town in the Wolong Nature Reserve; and 500 in Rilong Town, Xiaojin County; 5 030 in Qiaoqi Town; 1200 in Yongfu Township, Baoxing County; 650 in Taiping, Zhonglin and Dachuan Towns, Lushan County; 180 in Xiaohe and Lianglu Towns, Tianquan

County; 700 in Tai'an, Qingcheng Mountain and Yutang Towns, and Dujiangyan City. About 60% of the population is from minority groups. Net income of these people are listed in the following table (Sichuan Statistics Bureau, 2001):

	GDP per capita in 2000 (RMB: Yuan)	Net income of rural population in 2000 (RMB: Yuan)
Chengdu City	13 020	2 926
Ya'an City	4 949	1 909
Aba Prefecture	4 288	1 191
Ganzi Prefecture	2 797	733

The above figures indicate that the nominated area is a rather poor area, especially in remote locations in Aba and Ganzi.

2.3 Pressures/Threats

2.3.1 Tourism development

Except the 400 000 visitors to Qingcheng – Dujiangyan and 60 000 visitors to Wolong, tourists to other sites in the nominated area are limited. The flow of tourists is supposed to be enlarged to a large extent after its transition to one being listed in the Directory of World Natural Heritages.

After the launch of logging ban, many counties in this region depending on logging for cash income lost its revenue, so did communities in the region. Under such a pressure, both communities and local governments often raised high expectations to developing tourism. Revenue from properly organized eco-tourism has a great potential and could be a significant alternative livelihood in this poor region of China. Earnings will help to justify the protection of such large areas of forest. Revenues should in particular be allowed to flow down to the local communities living around the protected areas and who have few alternative earning options other than exploitation of the natural resources. Tourism development in this area should focus on ecotourism, which is characterized by minimized environmental impact from tourists, income directly benefiting conservation by providing alternative income to local communities and direct funding to protected areas. This usually requires sensible planning, good visitor management and qualified service, such as nature guides from reserves or local communities, viewing pandas and panda habitats. However, current development of tourism has caused environmental pressure by uncontrolled tourist flow into natural areas, disordered construction of hotels and roads, and ill-managed garbage and wastewater etc., which have had negative impact to wildlife and environment. This problem had occurred in Wolong where hotels and restaurants built in Hetaoping without proper plan, easier access to the pass on Balangshan created by road upgrade has led to trampling of rich alpine vegetation and plants being picked by tourists. Currently, Wolong is improving its tourist management and regulating facility

construction. Tourism management will be one of the major tasks for the management of this world heritage region.

2.3.2 Poaching

Some of the local farmers living in and around the nominated area still sometimes engaged in illegal poaching to supplement incomes. Animals with high economic value such as musk deer are often the target, but other animals, tufted deer, barking deer, black bear and even giant panda are accidentally injured and killed by indiscriminate snares. Cases on panda killing still occurs but greatly decreased since 1990's, due to severe penalties for killing or trading giant pandas and other State Category Protection Wildlife. However, in addition to strict law, what are also needed to eliminate poaching are patrols to prevent poachers, and assistance to local communities so their livelihoods could be less environmentally damaging.

2.3.3 Mining

Some mines of stone, multi-metals, coal and raw chemical materials are located in the conservation zone and the transitional zone of the nominated area. Their simple and crude equipment as well as backward technology result in serious destruction to forests and environment in some areas.

Three large-scale marble mines are located in Baoxing County. Mining activities cause noise and dust pollution as well as destroying vegetation cover and problems of disposal of waste materials. But a well managed and small scaled marble workshop to make carved panda souvenirs could be promoted as a 'green' industry for local handicrafts, a useful source of revenue from the tourist industry and can help in promoting the image of the giant panda and the its heritage park.

2.3.4 Pollution caused by metallurgical and chemical industries

The giant panda's living condition is threaten by the newly-established small-scale smelters and sulfuric acid plants at the entrance to the habitat, which, backward in technology and poor equipment, have polluted air, waters and soil to an evident degree.

2.3.5 Population growth

Population growth together with increasing need for living space add considerable pressure to land and resources. Populations in the nominated area are mainly from ethnic groups such as Tibetan and Qiang. There were 2 560 inhabitats of 421 households in the Wolong Nature Reserve in 1975, and 4 260 inhabitats of 904 households in 1995. Similarly, there were 3 000 inhabitats in Qiaoqi village, Baoxing county in 1957, which increased to 5 030 in 2000.

The government controls over population growth are relaxed in relation to minority groups so large families are normal in the nominated area. Special education programmes to promote population control are needed in addition to incentives to persuade more people to move out of the protected areas and find economic employment in the transitional zones or adjacent towns.

2.3.6 Agricultural incursions and overgrazing

The population increase has resulted in the clearing of natural vegetation to expand agriculture from the valley bottom to the steep slopes, and thus reduced the giant panda's habitats and activity areas. The alpine meadows of the nominated area are used extensively for the grazing of yaks and cows. This is particularly the case in the higher zones of the Wolong National Nature Reserve and the grassland areas of Aba and Ganzi Tibetan Autonomous Prefectures. There have been cases of over-grazing and degradation of alpine pastures. Some domestic grazing is probably essential to maintain the original vegetation condition since formerly these areas were grazed by higher densities of natural ungulates such as blue sheep and white-lipped deer which are now rather rare. One major task of the management of the Heritage Park will be to ensure that levels of grazing are stabilized within the natural capacity of these areas.

2.3.7 Logging and illegal cutting of wood

Forest resources are rich in the Qionglai Mountains, which have supplied woods for Chengdu Plain for a long time. But the forests on the east slope have already been cleared, and the forests in sub-high mountains have been felled in the recent 40 years. As a result, forests in the main tributaries have been felled to different extents and the habitats of giant panda have been cut apart. Thanks to the decision of the logging ban on natural forests by the Sichuan Provincial Government and the National Natural Forest Protection Programme, initiated by the State Government in 1999, the situation has had a fundamental improvement.

The human inhabitats of the nominated area use wood as their primary source of fuel and also cut wood, especially birch (*Betula*) trunks as substrate for growing edible fungi. Since the human population is growing fast this could become a serious problem in the future unless adequate controls and alternative energy resources are put in place quickly. These should include establishment of adequate wood plots in transitional zone areas to meet other legitimate wood needs.

2.3.8 Collection of medicinal plants

Collection of medicinal plants is a threat to the survival of some rare target species. In addition, the movements of collectors through the protected areas, especially if accompanied by dogs can constitute a serious disturbance to the shy giant pandas, forcing them to abandon

areas of suitable habitat.

Solution to this problem is complex and requires a multi-pronged approach including:

- Strict zoning of where collecting is permitted and of what species
- Supervision that collecting follows the agreed regulations
- Development of artificial rearing of medicinal plants in transitional zones and experimental zones of the nominated area
- Cooperation from the traditional medicine factories about bans on the buying of endangered species and the identification of substitutes in traditional prescriptions
- Extension work among communities engaged in collection of medicinal plants (and animals).
- Improved monitoring of the impacts of plant collecting on wild populations

2.3.9 Introduction of exotic species

Whilst the management authority both welcomes and encourages the efforts at reforestation of degraded areas within the nominated area, strict regulations and controls must be put in place to ensure that only appropriate local species are planted.

Use of exotic species, even from other parts of China, could cause threats to the native fauna and flora through the spread of alien invasive forms and species. Currently several non-native species of Larch (*Larix*), pines (*Pinus*), *Pauwlonia* and other trees, shrubs and flowers are being planted and this should be halted. Adequate nurseries for the rearing of local seed should be established to meet local reforestation needs.

The same rules should include prohibition of introduction of new bamboo species into the ecosystem out of misguided hope this will help giant panda.

2.3.10 Construction of infrastructure

A road through the Wolong Nature Reserve to Aba Tibetan Autonomous Prefecture traverses the nominated area. This is a busy route for lorries and buses and does cause some disturbance to roadside vegetation and wildlife. Another road from Baoxing to Mt. Siguniang is planned to be enlarged to bring more tourists in. Road construction and improvement is one of the major activity of the current Western Development Program. Road access is no doubt a key element in improving local people's livelihoods, but it is essential that careful planning is in place to avoid further fragmentation of panda habitats. Many roads lead into the nominated area for access to townships and farmlands are result from previous logging operations and some are already abandoned after the logging ban in 1998.

In addition, power lines, water channels and several hydropower plants exist and are being built within the nominated area. These features are regarded as essential services for local

development. However, the heritage management authorities should ensure that all such services and infrastructures are designed and managed in ways that cause the minimum of impact to the natural environment.

2.3.11 Capture of giant pandas from the wild

In addition to losses due to poaching, the panda population has suffered from excessive levels of capture and removal from the wild. Between 1950 and 1970 at least 70 wild pandas were captured for domestic and international zoos.

The people of Sichuan have always shown great love and care for the giant panda and Annex 4 lists many examples of spontaneous and often heroic actions taken to help and save pandas found to be in trouble. As a result nearly 80 wild pandas have been rescued into captivity within the province over the past 20 years. Some of these were quickly and properly returned to the wild but many have ended up in zoos or in special breeding centers for giant panda.

In many cases these rescues were genuine and essential to save the life of the animals in question but it is certain that the payment of financial incentives may have resulted in some healthy animals being caught unnecessarily. For this reason the government ceased the offer of financial rewards since 1988. In addition, zoos are also prohibited from offering financial 'thank you's to suppliers of rescued animals. Futhermore, a new "rescuing policy" was issued by the State Forestry Administration in 1999 to stop random capture of wild pandas. The management agencies must continue to ensure that only animals in real need of help are taken into captivity and that animals are assigned to the most suitable facility for their own well-being.

There are enough giant pandas in captivity to maintain a healthy captive population. No new animals need to be caught for this purpose. The breeding of captive population should be raised in efficiency so as to be self-sufficient and the programme for releasing captive born pandas back into the wild to boost waning wild populations or achieve outbreeding between different populations should be pursued with greater vigor.

2.3.12 Weak management

Although great efforts have been taken by the government in establishing nature reserves and scenic parks, the basic units of the nominated world heritage, lack of qualified human resources, together with inadequate funding becomes the major bottleneck for effective management of those sites. Enhancing management of these units will be one of the most important tasks of the world heritage.

The above is an incomplete list of factors that influence or threat panda population and habitat.

Some of these factors are interlinked to each other, and some are cuses of others. For example, development of mass tourism often requires road construction and more fuelwood collection, which have negative impacts on habitat. It is important that the conservation management strategy deals not only the direct causes but also root causes of habitat degredation and wildlife population decline.

2.4 Natural disasters

In addition to human caused threats, natural disasters should also be taken into account. The nominated area is located in the complex mountains and valleys with frequent natural calamities such as earthquakes, floods, debris flows, landslides, fires and synchronous mass flowering and death of bamboo.

2.4.1 Earthquake

The nominated area is located in the north-south earthquake belt in China. Three earthquakes with magnitude over 6 have occurred in history, respectively with the epicenter in the north end of the Labahe Nature Reserve with a magnitude of 6.5 in Sept., 1927; the epicenter in the west part of the south end of the Labahe Nature Reserve with a magnitude of 6 in June 21, 1941; and the epicenter on southeast verge of Mt. Daxuefeng Scenic Area with a magnitude of 6.25 in Feb. 24, 1970.

2.4.2 Floods

In the Jiajin Mountain Ranges, the rainfall is 150mm during 24 hours and 220mm during 72 hours, which results in 1.5 serious floods each year. Continuously heavy rain from July 27 to Aug. 4 in 1966 within the territory of Baoxing County destroyed all of the houses and cultivated land where in the Yanjing District Government was located.

2.4.3 Debris flow and landslide

The nominated area is located in the intermediate dangerous zone with debris flow and landslide, but the distribution of debris flow and landslide is different. The debris flow on July 8th, 1964 resulting from the heavy rain in Dengchigou of Baoxing County resulted in 29 deaths and 2 natural villages forced to remove. There has been over 10 debris flows with different destructive degrees within Mt. Siguniang Scenic Area in the past 40 years.

2.4.4 Forest fire hazard

With the implementation of the State Forest Conservation Stipulations, no large-area forest fire

occurred in the past 30 years, while small fires took place occasionally that were caused by burning the grass on wasteland or burning the crop remains for fertilizer. Most of the nominated area is in a very humid zone where the chances of large-scale fire are very small but some western forests are in a rain-shadow and could become fire-prone in a dry year. In conclusion, fire prevention is one of the important tasks for the management of the proposed heritage site.

It worths mentioning that most of the above natural disasters can also be induced or intensified by human factors: forest cutting may increase landslide and floods; monocultured plantations are fragile to forest fires, etc.. So it is critical to reduce or stop human caused threats.

2.4.5 Bamboo blooming

As one of giant panda's staple food, arrow bamboo bloomed and then withered in the early 1980s. The most serious ecological disaster in the past 50 years, from the point of view of the giant panda, affected nearly the whole nominated area in 1983, when more than 60% arrow bamboo bloomed (up to 95% specifically in Wolong and Pujigou, northwest in Baoxing County) and almost all arrow bamboo in places at 2300 ~ 3500 m above sea level bloomed and then withered.

Much publicity has been given to periodic mass flowering events of bamboo although it is part of the bamboo's normal life cycle, and usually there are two or more species of bamboo living in most panda habitats. However, bamboo flowering could become disastrous when the habitat is fragmented with only one species of bamboo available. The best strategy to minimize the damage to the wild panda population of future bamboo flowering episodes appears to be to ensure that adequate corridors and habitat connections remain to link giant panda sub-populations. For this reason the management plan for the Heritage Park places great emphasis on maintaining and re-establishing connectivity throughout the region and between the different protected areas and scenic sites of the nominated area.

3 Conservation and Management Strategies of the World Heritage

This management plan and strategy was developed in a participatory manner that involved Sichuan Forestry Department (SFD), Sichuan Provincial Planning Committee, Sichuan Environmental Protection Bureau (EPB), Sichuan Construction Department (SCD), Sichuan Land Resource Department, Sichuan Tourism Bureau, Ya'an City Government, Chengdu City Government, Aba Prefecture Government, Ganzi Prefecture Government, and all 7 nature reserves and 9 scenic parks, as well as the 12 counties where the parks and reserves located. Views from different agencies were coordinated and confirmation documents signed.

3.1 Management objectives

Goal (long-term)

The biodiversity, ecosystem and habitat of the giant panda will be effectively protected in the world

heritage site; social and economic development of human population will be harmonized with the natural environment

Objectives

- The giant panda population and habitat well protected so that the "flagship" species will live and expand;
- Natural features of outstanding global significance notably rare and endangered species, overall biodiversity, scenic values and geomorphic interests effectively protected in the World Heri tage;
- The Upper-Yangtze watershed and forest ecosystem well protected to provide adequate eco logical services locally and to downstream;
- Rich cultural heritage protected and perpetuated;
- Local community development sustainable - environmental pressures from development reduced; ecotourism well managed and sustainable, negative impacts to environment from other liveli hoods and threats (see section 2.2) are minimized;
- Increased public awareness and participation in conservation - making the world heritage a show case for environmental education and communication.

3.2 Management approaches

3.2.1 Zonation

Principles of the zonation

To ensure management feasibility and effectiveness, the nominated world heritage is divided into different zones according to the "Conservation Management Regulation on Sichuan World Heritage". These zones are:

Nominated area: including a core zone and a buffer zone;

Transitional zone: the area surrounding the nominated area, or conservation zone.

The following criteria were considered when the zones were divided:

1) The world heritage: mainly considered the area covers all major panda habitats and special natural and ecological landscapes of the Qionglai Mountains. It includes:

Core zone

- Concentrated panda distribution.
- Complete panda habitat.
- Concentration of biodiversity and original distribution of important type species.
- Relatively intact natural ecosystem and landscape.
- Low in human population, density less than 0.2/km^2.
- Core zone of nature reserves and scenic parks.

Buffer zone Rest of the conservation zone outside of core zone, human population density 4.9/km²

2) Transitional zone: Controlled area outside of the nominated area to ensure proper protection of the world heritage

Nominated area is 9 510 km², including core zone 5 370 km² and buffer zone 4 140 km². transitional zone is 5 290 km².

The regions concerned including the nominated area and its transitional zone involve 12 counties of 2 ethnic autonomous prefectures and 2 cities as indicated in following tables.

Administrative division of the nominated area

Administrative division		Nominated area or conservation zone (km²)	Core zone (km²)	Buffer zone (km²)	Transitional zone (km²)
Aba Prefecture	Wenchuan County (including Wolong Special District)	2 330 (2 000)	1 890 (1 720)	440 (280)	530
	Xiaojin County	980	70	910	1 540
	Lixian County	820	40	780	460
	Subtotal	4 130	2 000	2 130	2 530
Ya'an City	Baoxing County	2320	1 780	540	740
	Tianquan County	970	630	340	290
	Lushan County	580	400	180	400
	Subtotal	3 870	2 810	1 060	1 430
Chengdu City	Dujiangyan City	160	40	120	90
	Chongzhou City	200	110	90	170
	Dayi County	150	100	50	250
	Qionglai County	-	-	-	210
	Subtotal	510	250	260	720
Ganzi Prefecture	Kangding County	930	310	620	530
	Luding County	70	-	70	80
	Subtotal	1 000	310	690	610
Total		9 510	5 370	4 140	5 290

Distribution of the world heritage units

City/ prefecture	World heritage units	Nominated area (km^2)			Transitional zone (km^2)
		Subtotal	Core zone	Buffer zone	
Aba	Wolong National Nature Reserve	2 000	1 720	280	-
	Mt. Siguniang National Park	450	70	380	-
	Mt. Siguniang National Nature Reserve	530	-	530	1 540
	Miyaluo Provincial Park	820	40	780	460
	Caopo Provincial Nature Reserve	330	170	160	530
Ya'an	Fengtongzhai National Provincial Nature Reserve	540	340	200	-
	Mt. Jiajin Provincial Park	1 780	1 440	340	740
	Labahe Provincial Nature Reserve	240	200	40	-
	Mt. Erlang Provincial Park	730	430	300	290
	Heishuihe Provincial Nature Reserve	370	260	110	-
	Mt. Lingjiu – Mt. Daxuefeng Provincial Park	210	140	70	400
Chengdu	Mt Qingcheng – Dujiangyan National Park	160	40	120	90
	Mt. Jiguan – Jiulonggou Provincial Park	200	110	90	170
	Mt. Xilingxueshan National Park	150	100	50	250
	Mt. Tiantai Provincial Park	-	-	-	210
Ganzi	Jintang—Kongyu Provincial Nature Reserve	930	310	620	530
	Lanan Provincial Park (in plan)	70	-	70	80
Total		9 510	5 370	4 140	5 290

World heritage in different counties

No	Total area and population			Core zone		Nominated area		Transitional zone		Nominated area + transitional zone	
	County	km^2	Pop*1000	km^2	%	km^2	%	km^2	%	km^2	%
1	Baoxing	3 114	55	1 780	57	2 320	75	740	23	3 060	98
2	Wenchuan	4 083	110	1 890	46	2 330	57	530	13	2 860	70
3	Lushan	1 193	123	400	34	580	49	400	34	980	82
4	Tianquan	2 390	143	630	26	970	41	290	12	1 260	53
5	Chongzhou	1 090	646	110	10	200	18	170	16	370	34
6	Dayi	1 338	496	100	7	150	11	250	19	400	30
7	Dujiangyan	1 208	594	40	3	160	13	90	7	250	21
8	Kangding	11 423	108	310	3	930	8	530	5	1 460	13
9	Lixian	4 313	44	40	1	820	19	460	11	1 280	30
10	Xiaojin	5 583	77	70	1	980	18	1 540	28	2 520	45
11	Luding	2 165	77	-	-	70	3	80	4	150	7
12	Qionglai	1 378	640	-	-	-	-	210	15	210	15

Management norms for different zones and areas

Management of the world heritage will be conducted under the following legislations:

- Conservation Management Regulations on Sichuan World Heritage, by Sichuan Provincial Government (2002)
- Regulation on Nature Reserves of the People's Republic of China, by State Council (1994)
- Regulation on Nature Reserves of Sichuan Province, by Sichuan Provincial Government (2000)
- Regulations on Scenic and Historical Areas Management, by State Council (1985)
- Regulations on Scenic and Historical Areas Management in Sichuan, by Sichuan Provincial Government
- Planning Criteria on Scenic and Historical Areas, a National Standard, by State Council. (1999)

The following norms should be followed in management:

Core zone

Essentially natural or will be allowed to return to a natural condition. Within this zone no logging, hunting, burning, collection of medicinal plants, habitation, mines and industries will be permitted. Tourism will be strictly controlled to small-scale ecotourism in limited localities, no mass tourism allowed. Roads and infrastructures will be minimized-no new roads and large new infrastructure, such as hydropower facilities, allowed and no expansion of existing ones permitted. Research will be limited to non-destructive collection, observation and monitoring, grazing will be permitted only above the treeline in summer months in approved areas where there are inadequate natural grazers to maintain the alpine meadows and under permit. Abandoned farmland will be encouraged to recolonize naturally. Mines and polluting factories will be closed. Incentives should be provided to inhabitants inside core zone, to encourage voluntary resettlements to outside.

Buffer zone

This zone, lying within the nominated area and being managed primarily for conservation, does contain some human residents and more activities will be permitted than in the core zone. No agriculture expansion allowed, lands steeper than 25% will be replanted with bamboo and trees to accelerate return to natural state and serve as corridors for giant pandas. Remaining agricultural areas will be demarcated and serve as limits for human occupation. Construction of infrastructure is restricted and micro-hydro plants to reduce dependence on firewood will be permitted. Dependence on natural firewood will also be phased out through development of alternative energy resources. Tourism is allowed but restricted under carrying capacity and closely monitored. Construction of access roads and tourist facilities will be allowed within pre-agreed limits. Mines and polluting factories will be gradually closed. Grazing will be permitted only in fenced fields. Manipulative research permitted but no outside species to be introduced.

Transitional zone

Lying outside the nominated area, comprises additional lands of natural reserve, national park or provincial park status where conservation remains the dominant theme. However, this zone also includes various towns, roads, dams, hydropower stations, mines, factories, villages and farmlands along the valleys. Logging, hunting and burning natural vegetation are banned in this zone. Resource use should be sustainable. Farmland steeper than 25% will be converted to forest or grassland under an ongoing national programme. Tourism is allowed under monitoring. Polluting industries will be closed down. No new industry of negative environmental impact permitted.

3.2.2 Establishment of an effective management mechanism

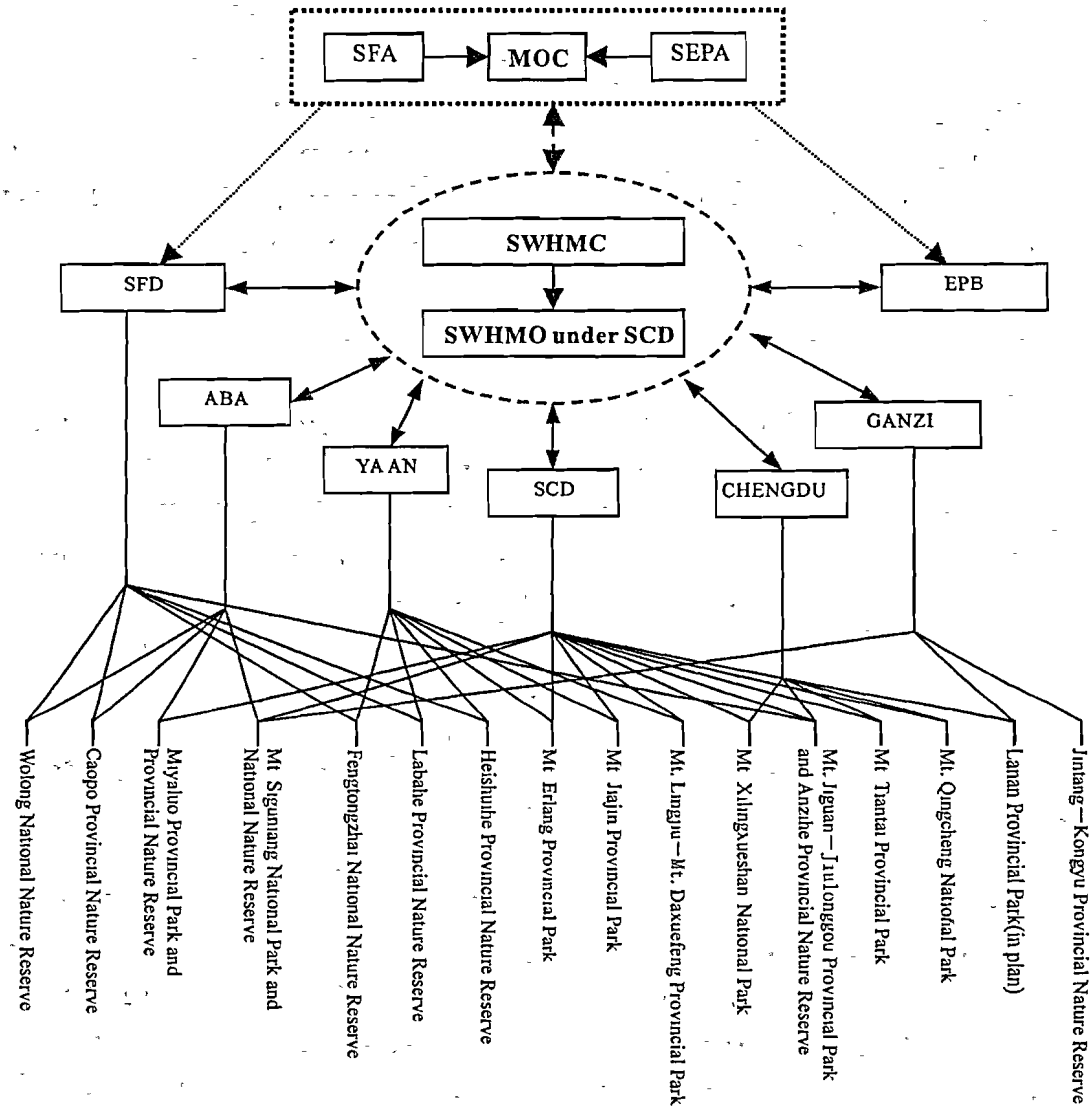
The nominated area covers the area of 12 counties in two prefectures and two cities, including 7 reserves and 9 scenic parks that are currently management under Sichuan Forestry Department (SFD), Sichuan Environmental Protection Bureau (SEPB) and Sichuan Construction Department (SCD). Thus management of the world heritage will involve coordination of multi-agencies. Sichuan Provincial Government has established a multi-institutional steering committee to handle the world heritage application, an office is also set up in SCD. In order to guarantee effective and consistent management of such a large area, a formal management mechanism should be structured as follows:

- Based on the existing steering committee, establish a "Sichuan World Heritage Management Committee (SWHMC)", which should be headed by a vice governor with top authority in the province. Its members will include representatives from SCD, SFD, EPB and other relevant departments such as the Provincial Planning Committee and Land and Resource Department, as well as governments of Chengdu City, Ya'an City, Aba Prefecture and Ganzi Prefecture.
- Set up a "Sichuan World Heritage Management Office (SWHMO), as an executive office of the above committee to be responsible to day to day coordination and communication. This office should be under SCD, consistent to the implementation focal point of World Heritage Convention in China.
- A parallel Scientific Committee is also important to ensure management decisions are based on scientific basis.

Terms of References of the committee and the executive office include several aspects:

- Relying on existing management system, build management consensus among involved agencies.
- Coordinate communications and management consensus among parties; develop new policies and legislations on management when necessary.
- Responsible for organizing monitoring and evaluation on management of the world heritage, making sure that the monitoring and evaluation are scientific, comprehensive and independent.
- Develop and update overall management plan for the world heritage, incorporating the monitoring results into such a plan.

The WH management structure is illustrated here



Note:

MOC	Ministry of Construction of the People's Republic of China
SFA	State Forestry Administration of the People's Republic of China
SEPA	State Environmental Protection Administration of the People's Republic of China
SWHMC	Sichuan World Heritage Management Committee
SWMO	Sichuan World Heritage Administrative Office
SCD	Sichuan Construction Department
SFD	Sichuan Forestry Department
EPB	Environmental Protection Bureau of Sichuan Province
ABA	Aba World Heritage Administration Committee
YA'AN	Ya'an World Heritage Administration Committee
CHENGDU	Chengdu World Heritage Administration Committee
GANZI	Ganzi World Heritage Administration Committee

The management unit of the world heritage is a nature reserve or a scenic park. Each unit remains in its original management structure, receives administrative support from local governments and technical support from its focal department. Thus each department will maintain its existing authority and responsibility. The main differences in management for the world heritage are increased coordination among institutions and enhanced monitoring.

3.3 Conservation and management programs

Some of the following programs are ongoing and some are proposed. The purpose of making this plan is to coordinate activities that are managed by different departments so efforts will not be duplicated and returns maximized.

3.3.1 Management programmes

Expansion of nature reserves

Under the framework of approved Sichuan Wildlife and Nature Reserve Program, expand the area of existing reserves and establish new nature reserves in the nominated area based on the results from the third national panda population and habitat survey.

Effective management of world heritage units and law enforcement

Review existing management plans from individual reserves or scenic parks, updating and adjust goals and objectives according to the needs of the world heritage, strengthen law enforcement and implement the management plans.

Implementation of conservation plans on giant panda and other important endangered species

This is part of the ongoing Sichuan Wildlife and Nature Reserve Program, has been approved by the national government.

Restoration of panda habitat and re-establishing corridors

Integrating current ecological restoration policies and the needs of panda habitats, restoring steep farmland into needed panda habitat. Special attention will be placed on maintaining connectivity across vulnerable bottlenecks or corridors in the giant panda distribution. Corridors have been identified both by examination of forest connectivity using satellite images and also based on field surveys, especially the third national panda survey and ongoing monitoring by panda reserves as follows:

- Guobayangou (Fengtongzhai Nature Reserve) – upstream tributaries of the Huangshuihe (Da-xuefeng Scenic Spot);
- Dengchigou (Fengtongzhai Nature Reserve) – upstream tributaries of the Huangshuihe (Da-xuefeng Scenic Spot);

- Huoshiqi (Fengtongzhai Nature Reserve)–Dahe (Heshuihe Nature Reserve);
- Ruobigou (Mt. Jiajin Provincial Park)–Dashuigou (Fengtongzhai Nature Reserve);
- Ganyanggou (Mt. Jiajin Provincial Park)–upstream tributaries of the Baishahe (Mt. Erlang Provincial Park);
- Meilichuan (Mt. Jiajin Provincial Park)–Baisha River (Mt. Erlang Provincial Park);
- Upstream of the Talahe (Mt. Erlang Provincial Park)–upstream of the Labahe (Labahe Nature Reserve).

A new assessment should be conducted when the data of the third national survey on the giant panda and its habitat is made available.

Such corridors provide links between normally separate breeding sub-populations centered in different valleys but become extremely important in maintaining out-breeding between these populations, such as dispersal of young pandas. Such corridors must be especially important in the event of mass flowering and die off of bamboo, allowing safe passage to neighboring valleys where the bamboo may be out of synchrony and more plentiful. Special efforts will be made to preserve and protect the vegetation and bamboo cover of these corridors so that they are available to pandas whenever they wish to move from one sub-population to another. Where corridors have been encroached by former logging or agricultural activities, an active programme of habitat restoration will be applied involving planting of shade trees and tussocks of the appropriate bamboo species to form an underscore. Natural regeneration will be encouraged.

Corridors link other areas, such as the connection of the Jiajin Mountain habitat and Jiguan Mountain-Qingcheng Mountain habitat, located between the Huangshui Stream (Mt. Daxuefeng Scenic Spot) and the Heishuihe (Heishuihe Nature Reserve), as well as the connection of Jiguan-Qingcheng Mountain habitat and Wolong habitat is located on the watershed divide of Anzihe of Wenjing River (Jiguan Mountain-Jiulong Gully Scenic Spot) and Xihe Stream of Shoujiang River (Wolong Nature Reserve). All these corridors are vital for the natural reproduction of wild giant pandas, to maintain outbreeding.

The center areas planned for the nominated area are the main places where traces of giant panda have been found, which include all the vital corridors crossing watershed divides, and it is also the places with golden monkey, takin and Chinese monal. Those places with many traces of giant panda and other rare animals are defined as buffer zones; the places with scattered trace of giant panda and small number of wild animal are defined as transitional zone.

Eliminating or reducing environmental damage from mines and polluting industries

Mines and polluting industries in core zone will be closed immediately; the ones in buffer zones will follow. In the transitional zone, mines and industries will be requested to be monitored closely. The ones causing much environmental impact will to closed in a phased manner. The

land damaged by the mines will be restored as needed. A discussion on such a program has already been initiated by the World Heritage Office with local government during the preparation of this management plan.

Population control in the world heritage

Health education and family planning tools will be introduced. Incentives will be provided to those living inside the core zone to relocate voluntarily.

Community participation in management of the world geritage

Communities inside the world heritage and its transitional zone will integrate its development in line with the world heritage management criteria; in the mean while, the world heritage management will also involve communities so community development and world heritage management will become harmonized.

Management planning and updating

Upon acceptance of the site by World Heritage Committee, all involved agencies will be asked to review current plans, and if necessary, will be brought into line with this overall plan. All further revisions of those management plans and all subsidiary site development or programme development plans relevant to lands within the WH site will have to be developed in a participatory manner and approved by the Sichuan World Heritage Management Committee. A 5-year planning cycle will be necessary to update the overall WH management so management criteria, regulations and legislations, and support will be evaluated and adjusted according to the needs. Information collected from monitoring will be reflected into the management planning. Sichuan World Heritage Office will organize a participatory process, inviting all the management units and involved governmental and non-governmental agencies to discuss issues and needed strategies in the revised overall management plan.

3.3.2 Monitoring

Currently a monitoring system has been designed and began implemented in panda reserves in the region. The Chinese Academy of Sciences and the Sichuan Forestry Institute also have monitoring stations set up for various ecological parameters. The idea here is to enhance the existing monitoring system, to build a network among institutions so information will be integrated, and to fill the gaps in monitoring both geographically and technically. Monitoring will be conducted by staff in each WH unit through proper training, technical assistance will be provided by scientists or members of the WH Scientific Committee. Digitalized databases for each WH unit will be set up. The World Heritage Office will be responsible to coordinate monitoring plans and activities from each WH unit; a research institution will be identified to gather information from each unit and to analyze the trends. A GIS based management system will be established.

The monitoring programme has several elements. In several cases it is essential to establish sound

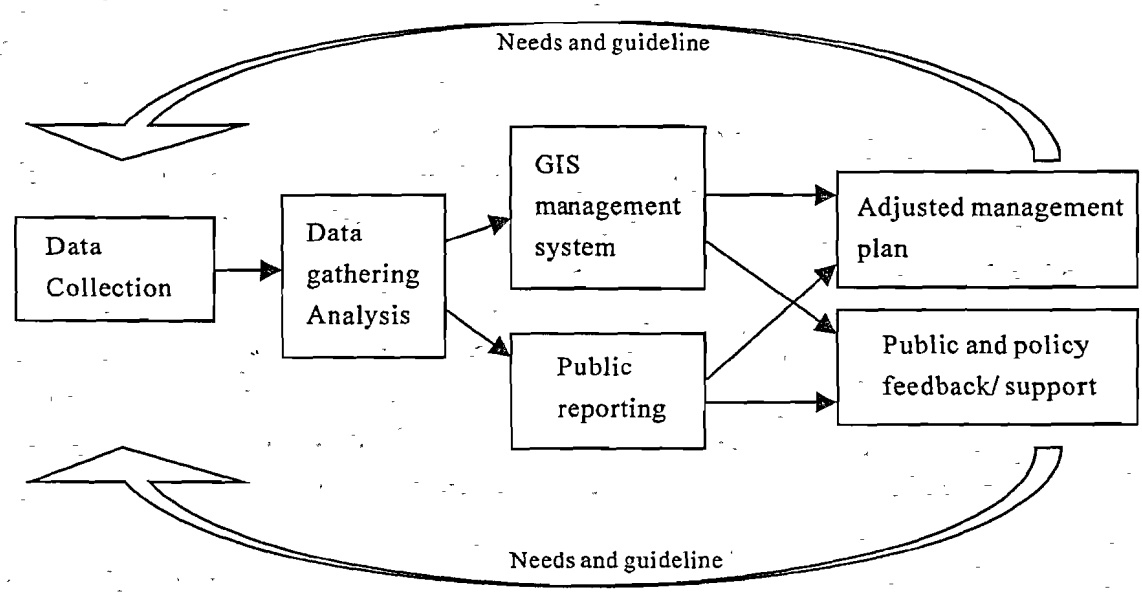
baseline data at the outset.

The following table summarizes the different subjects to be monitored (including baseline data collection) and recommended institutions to undertake the tasks:

Data to collect in monitoring	Responsible agencies
Overall vegetation cover using satellite imagery time series	A research institution in Sichuan
Physical parameters 'C climate, river flow, and sediment loads etc.	Trained staff from protected areas and relevant ecological observation stations
Condition of vegetation and especially bamboo by foot patrols and sample quadrates in respective management units	Staff of respective protected areas
Giant panda and other significant wildlife by foot patrol reports and periodic recensus	Staff of respective protected areas
Socio-economic conditions in local communities and trends of their livelihoods	Trained staff from protected areas and teams contracted by Sichuan WH Administration Office
Tourism development, numbers of visitors, revenues and impacts on scenic areas and environment	Trained staff from protected areas, county EPB offices and Dept of Tourism
Pollution from residual industries in transitional zone	Provincial and county EPB offices and contracted research institutions
Progress on respective action programmes and governmental policies	Respective executing agencies for different programmes, contracted research institutions

Monitoring is useless without proper reporting. In addition to their normal reporting to their mother units, each management units within the WH site will be required to prepare periodic reports for submission to the Sichuan World Heritage Administration Office whose role will be to collete these reports and prepare an overall annual progress report on the whole WH site.

A completed monitoring flow is shown as following:



3.3.3 Research

A programme of research would have several components and many projects. Research would be undertaken by various departments, scientific institutes and universities and also international collaborators and programmes.

The research programme would build on the considerable research already undertaken and ongoing, particularly the work undertaken at Wolong and Dujiangyan and the continued interest of research institutes, universities and organizations in and outside of Sichuan.

Research would be most encouraged in areas that can help in the improvement of management and conservation of the area, notably:

- Establishment of GIS database for monitoring vegetational changes from remote sense data and integration with wildlife data reported during monitoring and census.
- Continued studies of ecology of wild giant pandas and other precious wildlife (pheasant, golden monkey, red panda, takin etc.)
- Captive breeding and reintroduction trials of selected rare species
- Ecology and flowering patterns of bamboo species
- Continuing inventory of unsurveyed regions and lesser known taxa
- Habitat restoration methodology
- Taxonomic studies of special species groups "C rhododendrons, lilies, pheasants etc.
- Artificial propagation and processing of medicinal plants
- Socio-economic studies and surveys

All applications for conducting research must be submitted to the responsible management agency concerned, but must also be communicated with and coordinated by the Sichuan World Heritage Administration Office. In each case a clear contract should be drawn up between the management agency and the researchers concerned clarifying the nature of the research, ownership of intellectual property of the results, deposition of duplicate specimens, reports and publications, acknowledgements and citations. Agreed inputs from each side must be specified such as assistance in housing, transport, translation, maps or data to be provided or guides needed. Fees may be charged by management units for their assistance. All foreign researchers must be accompanied by national counterparts at the expense of those foreign researchers.

3.3.4 Public Awareness and environmental education

A comprehensive education programme will be developed aimed at three groups:

- Schools in local towns and villages
- Local communities living in the conservation zone
- Visitors and tourists

In collaboration with respective management units, a series of information/interpretation centers will be constructed. Existing museums, public access breeding centers and education centers will also be improved. Maps, displays, brochures, booklets and other materials will be produced.

Courses will be developed for use in local schools aimed at educating children about the importance of maintaining watershed functions, fire control, and the amazing local biodiversity. The materials should foster a love and pride in their local heritage and also show the benefits that can accrue to the local economy through careful protection of the site and through eco-tourism. School outings will be organized to show the children the beautiful scenery and wildlife of their surroundings.

Extension services reaching remote villages and households in the conservation zone will deliver special materials on reforestation, erosion control, waste disposal, watershed protection, biodiversity importance. This will be reinforced by the placement of educational posters and by active support programme in developing more sustainable livelihoods and recruitments into the protection, monitoring, research, tourism and other active programmes.

3.3.5 Capacity building

Goals

Uniformly insure the quality standards and methods of GIS management through propagating new conceptions, theories, information and technology concerning the World Heritage; improve levels in profession and management, expand academic exchange between various countries in governing the world heritages.

Objects

The program includes basic training and skill training, especially the application of GIS method in management matters. It is planned to establish a special provincial training course within an existing training center for the capacity building of world heritage staff at various levels, based on a training need assessment. A management training plan for the protection of giant panda and natural & cultural heritage will be implemented during 2002 ~ 2010.

Organization

Set up a training center under the Sichuan World Heritage Administration Office; Compile textbooks for training and set professional lectures; Encourage staffs to get advanced studies in colleges and other institutions at home or abroad. 800 ~ 1200 staffs are to be trained during the year between 2003 and 2010. In addition, study tours and training workshop are planned for the staffs to visit a number of international world heritage natural sites to broaden their experience and raise standards.

3.3.6 Tourism management and ecotourism development

Eco-tourism is one of the world's fastest growth sectors and this is through in China also. Not only are numbers of international tourists visiting China continuing to increase but also rising living standards within China is driving a fast growth in domestic tourism. The eco-tourism programme will be developed with the objectives of raising revenue for the local economy and creating education and awareness for the general public.

The types of development and the levels of tourism will be strictly controlled within carrying capacity of the various scenic and cultural areas concerned and with a great care to minimize disturbance to wildlife, to protect the environment and to be sensitive to local culture.

Every encouragement will be given to small-scale, low impact tourism enterprises developed and managed by local communities to ensure that a high percentage of the revenues realized remain within the regional and reinforce further protection of the site.

Large-scale, external investments will be resisted as these would have higher impact and much of the revenue would be taken away from the locality and local economy.

To ensure that these principles can be realized, all tourism development plans should be approved by the Sichuan World Heritage Administration Office.

A list of scenic areas already identified for development or already being managed for tourism is given above. Additional sites may be identified to meet growing demand for tourist destinations and to reduce impacts by spreading the tourism pressure.

For instance it is suggested to build a special museum at the mouth of the Dengchi Valley close to the main road from Baoxing to Fengtongzhai, to celebrate and interpret the amazing collecting work of Pere Armand David. Baoxing County under its former name of Moupin is one of the great type specimen collecting sites of the planet. Whilst stationed at the Dengchi Mission between 1862 and 1875 David not only first described to science the giant panda but also first collected several hundred other type specimens of mammals, birds (65 new species), other animals and plants. The famous dove tree is named in his honor *Davidia involucrata*. Many of these local type specimens are splendidly carved on marble slabs along the roadsides of Baoxing Town. Such a museum would be of extreme interest to visitors entering passing into the county interior and should be a source of pride and inspiration to county officials and residents. The museum would also recognize the international nature and global significance of such biodiversity heritage.

An overall tourism management plan will be developed for the world heritage to regulate construc-

tions of tourist facilities and to set up site-specific norms on tourism development in different zones within the world heritage.

3.3.7 Sustainable community development

Hardships to the already poor local communities imposed by further restrictions on their agriculture and grazing activities will be more than compensated for by an active support programme focused on developing less destructive and more sustainable livelihood and industries. An assessment will be necessary to identified targeted groups and feasible alternatives to develop environmental friendly livelihoods. It is obviously a long-term work. One useful approach is to attract social development organizations to work side by side with nature reserves and conservation organization. Potential projects on community development in this area are:

- Alternative energy, such as biogas and micro-hydro power
- Sustainable non-timber forest product (NTFP) collection and marketing
- Community-based ecotourism development, especially homestay lodges, tour guide training and handicraft making
- Training on advanced, environmental-friendly farming techniques
- Valuable cash tree planting
- Alternative livelihood skill training

It is important to link these livelihoods development activities with communities' involvement in conservation actions.

4 Budgetary Resources Required

Since the site is managed as 16 different properties each with their own budget and management plan and several only partly inside the WH site, it is difficult to give an exact figure for current or future financing and financing will continue to come from many different directions. For instance China has recently launched its Great Western Development Programme, which will target the western provinces for special investments to help them catch up economically with the eastern half of the country. Funding from this programme can be used for improving communications, infrastructure, tourist facilities, development of alternate livelihoods, forest protection and reforestation works.

The current national ecological restoration programs and conservation programs implemented by the State Forestry Administration and Sichuan Forestry Department will also provide significant funding in supporting panda habitat restoration; nature reserve expansion or establishment; law enforcement, reserve management, giant panda and other wildlife researches, etc.

Staff salaries of over 500 state employees are already covered under the payroll at provincial or county levels. Major increases are seen in China in the area of public sector investment in tourism and other industries. Undoubtedly investments by Sichuan Provincial Government will rise markedly if the funds raised through panda exhibition loans are received on the understanding that they will be reinvested into conservation of the giant panda. Such earnings can make a substantial contribution to the costs of protecting the site.

The table below summarizes anticipated budget requirements over the first 8 years as a WH Site. The figures are based on 2000 costing and will rise with inflation.

RMB: Yuan

Programme	**(2003～2010)Budget**	**Source of funds**
Management Programmes	404,000,000	Covered under ongoing government payrolls of approved management plans and current governmental programs such as NFPP, "Grain to Green", and Wildlife and PA programme
Law Enforcement	8,000,000	Included in routine government budgets
Eliminating or reducing environmental damage from mines and polluting industries	390,000,000	State, Sichuan Provincial and Local governments
Panda corridor protection and habitat restoration	580,000,000	Ongoing national programmes such as NFPP, Grain to Green and updated panda conservation action plan
Management Planning	3,000,000	SWHAO to coordinate with different PAs
Monitoring	58,000,000	Covered under routing PA activities but at site level SWHAO to raise source for additional funding
Research	58,000,000	Many national, provincial programmes plus international collaboration sought
Education/extension	30,000,000	Provincial Government
Eco-tourism development	37,300,000	Some local government investment. Mostly from private investors
Training/capacity building	30,000,000	International funds to be sought
Development of livelihoods	51,000,000	Some government funding, other assistance to be sought from international agencies
Total	**1,956,000,000**	**Various sources, mostly committed or sponsored by Chinese government.**

Bibliography

[1] Qin Zisheng. Ecological Environment of Sichuan Giant Pandas and Renewal of their Staple Food-Bamboos. Collection of Studies on Bamboos. 1985, 4 (3) (in Chinese)

[2] John Mackinnon, et al. National Conservation Management Plan for the Giant Panda and its Habitat. Minis try of Forestry of the People's Republic of China and World Wide Fund for Nature. Printed by Chian Alli ance Press, 1989

[3] Sichuan Research Institute of Forestry Reconnaissance & Design and Sichuan Adminis trative Station for the Investigation and Protection of Wildlife Resources The Overall Plan Design of Sichuan Labahe River Provincial Nature reserve. December 1994 (in Chinese)

[4] Sichuan Rural-Urban Planning & Design Institute, August. The Overall Plan for Mt. Xilinxue National Park. 1994 (in Chinese)

[5] Ouyang Zhiyun et al. Study on the Application of Geographical Information System in Ecological Environ ment Appraisal of Giant Panda in Wolong Reserve. China's Biosphere Conservation. 1995, (3) (in Chinese)

[6] Sichuan Rural & Urban Planning & Design Institute. The Overall Plan for Mt. Jiguan-Jiulonggou Provincial Park. October 1996 (in Chinese)

[7] Sichuan Research Institute of Forestry Reconnaissance & Design and Sichuan Adminis trative Station for the Investigation & Protection of Wildlife Resources. The Overall Plan of Wolong National Nature reserve. 1998 (in Chinese)

[8] Sichuan Rural & Urban Planning & Design Institute, September. The Overall Plan of Mt. Siguniang National Park. 1998 (in Chinese)

[9] Tiantai Provincial Park. Chengdu Planning & Design Institute. The Overall Plan for Mt. August 1989 (in Chinese)

[10] Kangding County Forestry. The Overall Plan for the Jingtang – Kongyu Provincial Nature Reserve. 1998 (in Chinese)

[11] Timothy Swanson, et al. The Economics of Panda Reserve Management: A Case Study of Wolong Reserve, Sichuan, China. A Stady Prepared on Behalf of the China Council for Internation Coop eration on Environ ment and Development, 1999

[12] Sichuan Research Institute of Forestry Reconnaissance & Design and Sichuan Administrative Station for the Investigation and Protection of Wildlife Resources. The Overall Plan of Fengtongzhai National Nature Re serve. 2000 (in Chinese)

[13] Sichuan Rural & Urban Planning & Design Institute. The Overall Plan for the Mt. Qingcheng-Dujiangyan National Park. 2000 (in Chinese)

[14] Sichuan Rural & Urban Planning & Design Institute. The Overall Plan of Mt Jiajin Provincial Park. 2000 (in Chinese)

[15] Paul Box. GIS ane Cultural Resource Management: a Manual for Heritage Managers. Southeast University Press, 2001

[16] Jianguo Liu, et al. Ecological Degradation in Protected Areas: the Case of Wolong Nature Reserve for Giant Pandas. Science, 2001, 292(6)

[17] Sichuan Rural & Urban Planning & Design Institute. The Overall Plan for Miyaluo Provincial Park. Feburary 2002 (in Chinese)

[18] The People's Government of Yaan City. The Wold Heritage Management Plan for Jiajin Moun tains Giant Pandas habitat, 2002 (in Chinese)

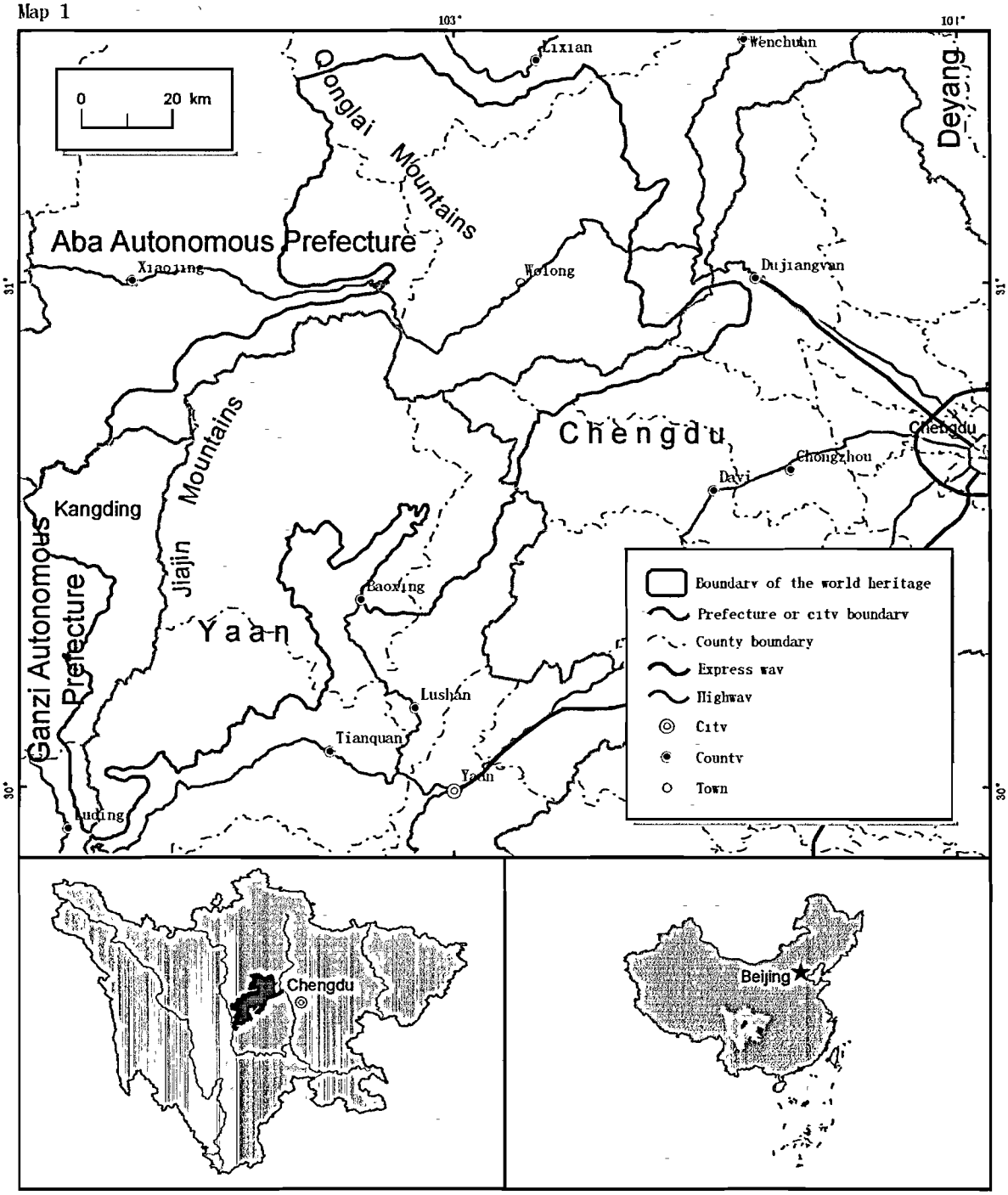
[19] The People's Government of Aba Tibetan and Qiang Autonomouns Prefecture. The Wold Heritage Man agement Plan for Wolong - Mt. Siguniang Giant Panda Habitat, 2002 (in Chinese)

[20] The People's Government of Chengdu City. The Wold Heritage Management Plan for Mt. Xilingxue - Mt. Jiguan - Jiulonggou Giant Pandas Habitat, 2002 (in Chinese)

[21] Forestry Bureau of Sichuan Province. Overall Plan for Protecting the Wild Animals and Plants and Building Nature Reserves in Sichuan Province. 2002 (in Chinese)

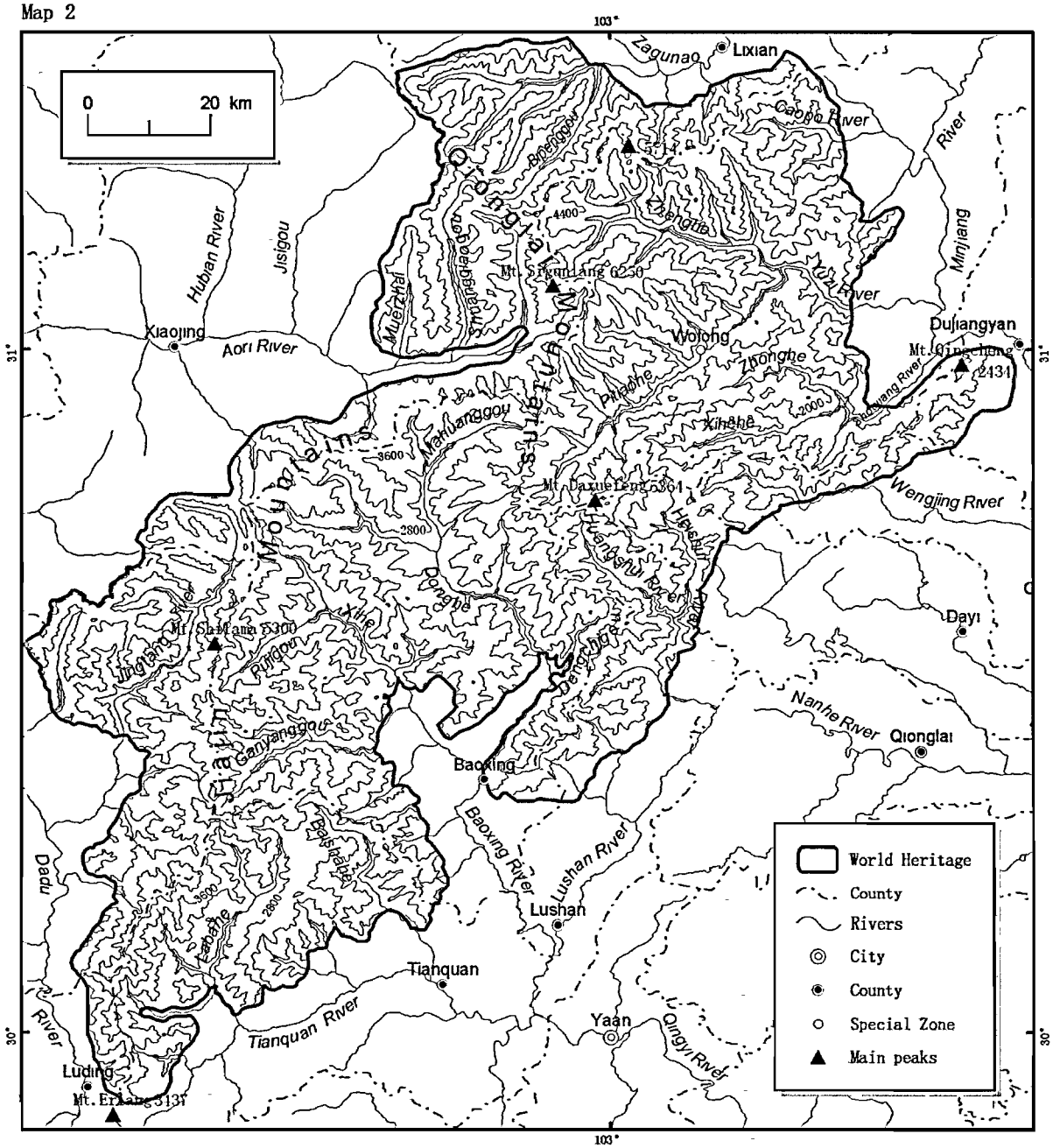
Location Map of the Nominated Area

Map 1



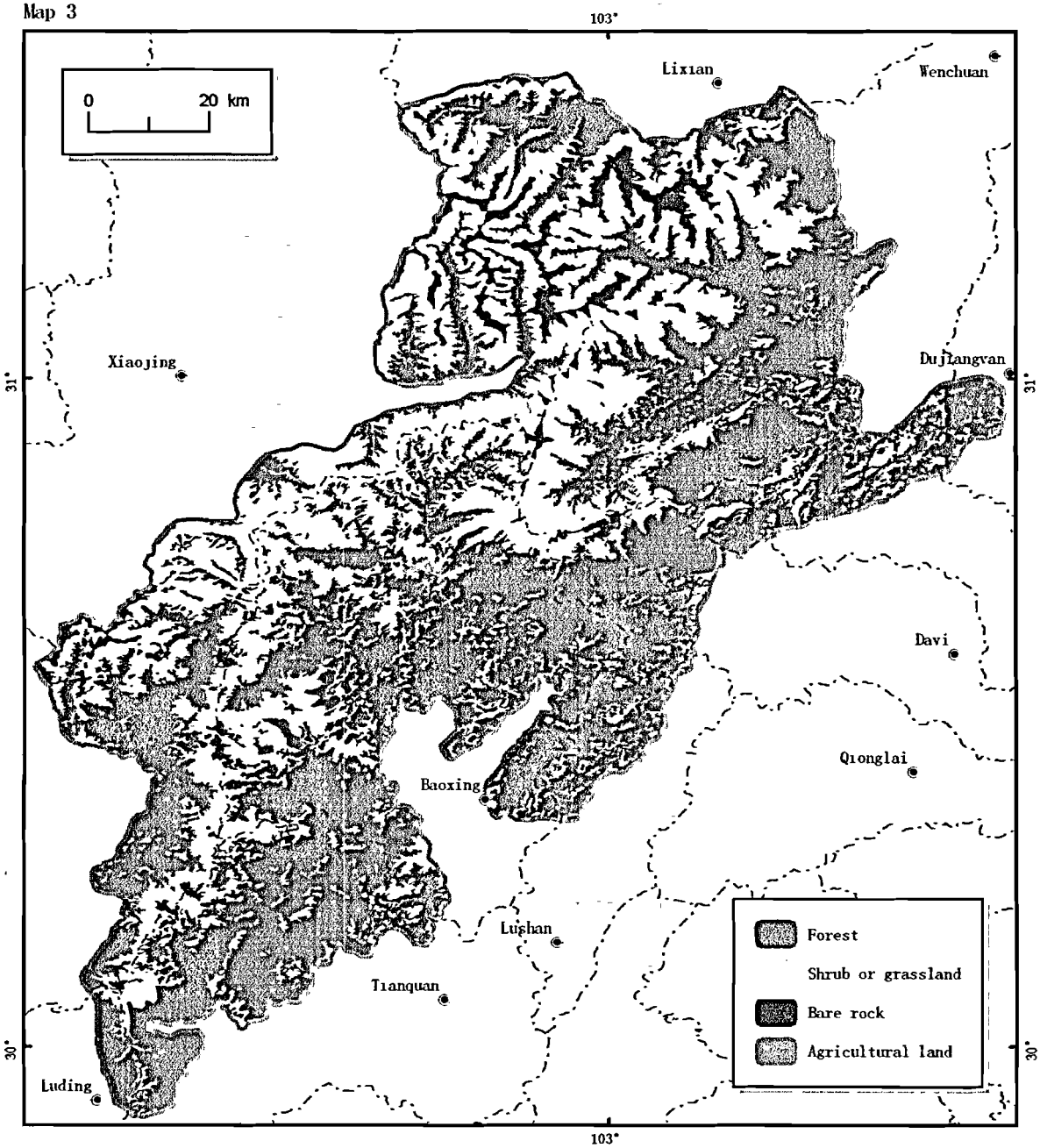
Topographical Map of the Nominated Area

Map 2



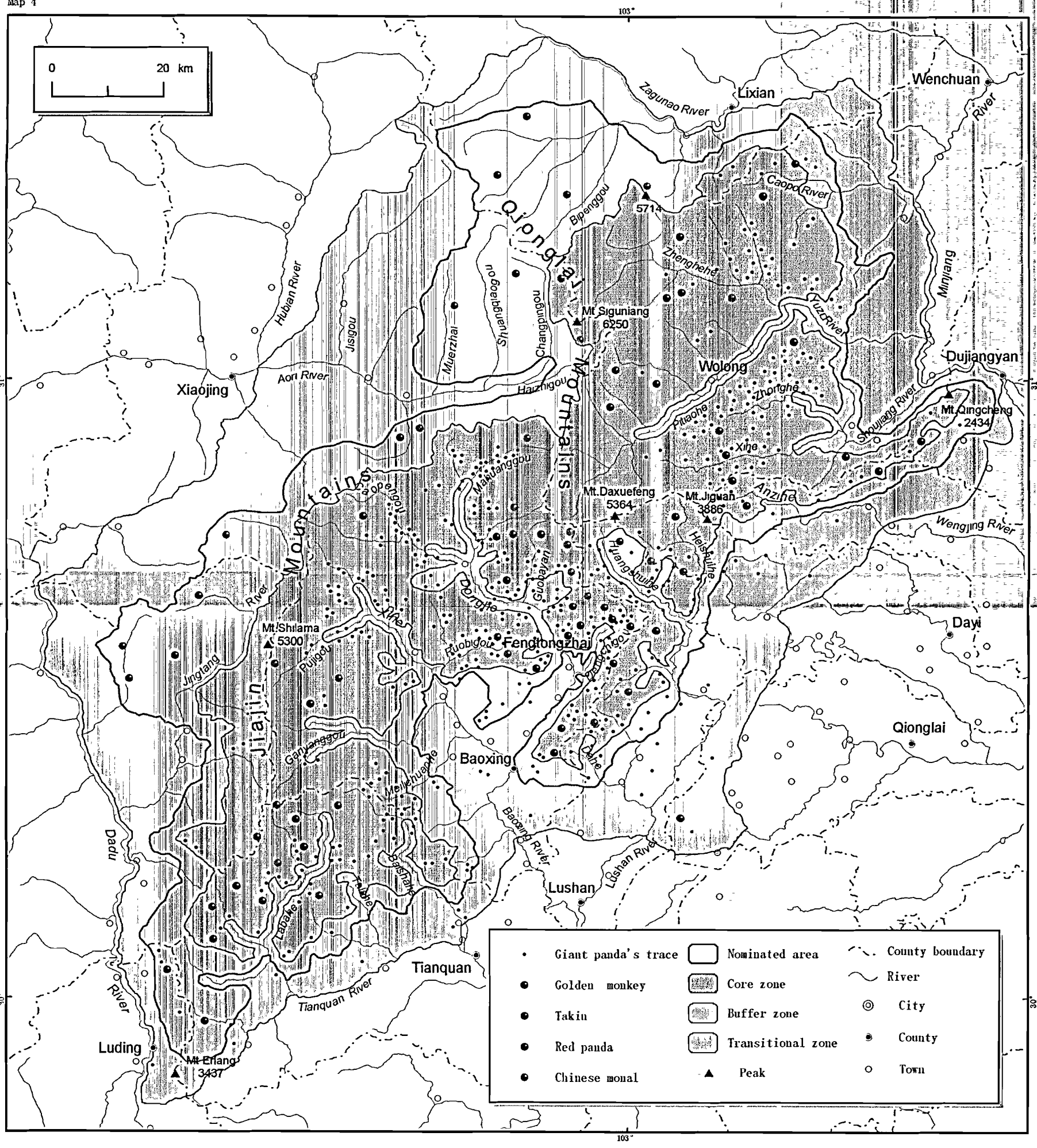
Vagetation Map of the Nominated Area

Map 3



Map of the Nominated Area for the Overall Plan

Map 4



Map for the Planned Protection in the Nominated Area