



Executive Summary

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Executive Summary

Introduction

The mountains of southwest China encompass the temperate to alpine montane region found between the eastern-most edge of the Tibetan Plateau and the central Chinese plain. Some of the largest remaining blocks of contiguous forest in China are located in Western Sichuan, within this mountainous zone, while the Tibetan Plateau is characterized by extremes in topography, vegetation and climate. During the summer months, the Tibetan Plateau acts as a barrier to the monsoon and traps clouds and moisture, giving the alpine flora a lushness found nowhere else on Earth—an extraordinary 230 rhododendron species are found here, half of which are endemic to the region. The diverse vegetation provides habitat for many endangered and endemic wildlife species, including Giant panda, Red panda, Golden monkey, Snow leopard, and Takin. Based on the area's high vascular plant diversity, impressive mammalian diversity and high levels of endemism among avian species, the Mountains of Southwest China are recognized as one of 34 global Hotspots of biodiversity (Mittermeier et al. 2004).

This Biodiversity Hotspot, comprising nearly one-tenth of China's land area (about 800,000 km²), contains the eastern Tibet Autonomous Region, northwestern Yunnan, western Sichuan, the southeastern tip of Qinghai and the southern tip of Gansu—the greater Hengduan Mountains—and harbors the richest biodiversity of any temperate forest region in the world (Boufford et al. 2004).

The region is also culturally rich. Nearly 80 percent of the hotspot is inhabited by Tibetans, who are strong believers in Tibetan Buddhism, which teaches unique cultural values and perceptions toward life and the natural world. For example, in Ganzi Prefecture, western Sichuan, Tibetan villages and monasteries have designated more than 2,000 sacred natural sites, thereby providing critical refuge for wildlife by preserving and sustaining habitats. Some sacred mountains have survived the large-scale commercial logging of the last century and remain old-growth forests.

In Ganzi Prefecture of Sichuan and eastern Tibet, those places where wildlife still can be found are most often the protected sacred sites of local villages and monasteries. The practice of protecting sacred sites has resulted in an accumulated wealth of indigenous knowledge on land-use and resource management and is still functional in many places despite strong influences from outside the region. This non-material value system presents a unique opportunity for biodiversity conservation in the Mountains of Southwest China Hotspot and is especially important in promoting sustainable development and livelihoods, not only for Tibetan communities but also for the rest of Chinese society.

This cultural tradition now faces great challenges from rapid social and economic development. Building roads through remote areas has caused habitat destruction and has attracted increasing numbers of tourists who further disturb habitats and stimulate wildlife consumption. Tourists from outside the region also have had a gradual but profound influence on the Tibetan culture. Tourists help create a market for wild fishes which Tibetans refused to eat before, because of the high prices in restaurants.

Conservation International, working with local partners and stakeholders, aims to protect the Mountains of Southwest China Hotspot's unique biodiversity by revitalizing Tibetan cultural values and expanding the scale of the traditional protection system among Tibetan communities as an effective measure for creating protected areas and biodiversity corridors. This project involves the mapping of sacred sites, assessing their biodiversity values, documenting and gathering traditional knowledge, reviving Tibetan cultural and traditional practices of sacred lands management, and promoting the legal recognition of sacred lands as a community-based land management and protection mechanism.

RAP Expedition Overview and Objectives

A Rapid Assessment Program (RAP) team of Chinese and international biodiversity experts surveyed three remote valleys in the Mountains of Southwest China Hotspot, Sichuan Province, China from August 22 - September 9, 2005. The RAP program worked closely with CI-China's Chengdu office staff, and other Chinese partners, including the Sichuan Academy of Forestry, Peking University, Southwest China Normal University, Heilongjiang University, Southeast Forestry College, Huangshan University, Guizhou Academy of Sciences, Shangri-la Alpine Botanical Garden, and the Sichuan Regional Forestry Department to conduct the biodiversity surveys. A RAP team of expert scientists from China and several other countries surveyed the diversity of ten taxonomic groups: plants, ants, beetles, orthoptera (grasshoppers, crickets and katydids), other insects, fishes, reptiles and amphibians, birds, and mammals.

The specific aims of the expedition were to:

- Highlight the biodiversity of Southwest China to raise awareness among the global general public,
- Collect biodiversity data to assist in guiding conservation activities and management of Tibetan Sacred sites in the region, and
- Enhance scientific capacity in the Himalayan region by developing collaborations between international and local scientists and by providing training to students in biodiversity assessment field methods and taxonomy.

Twelve Chinese and nine international scientists formed the core RAP team and were joined by over 10 local government staff. The RAP brought together scientists from many Chinese scientific institutions, local and regional government officials, and local Tibetan communities for the first time. Despite the language barrier, the Chinese and foreign scientists worked very well together and formed several collaborative relationships that will continue well beyond this RAP survey.

The data collected will be used to justify and determine boundaries for the expansion of nature reserves and parks in the region, as well as to delimit the Tibetan Sacred Lands. The goal of CI's Sacred Lands Project is to conserve the unique biodiversity of the Mountains of Southwest China Hotspot by promoting traditional Tibetan sacred lands and resource management systems in the region, and promoting the associated sustainable lifestyle values to the broader Chinese society. The RAP data will inform CI and local Tibetan communities of the rich biodiversity on their lands and help them promote protection of their lands beyond their communities.

Study Area

Site 1. Danba. August 22-26, 2005. Habitat consisted of alpine conifer forest, conifer-broadleaf mixed forest, oak forest, bamboo forest and grassland at an elevation range of 3285-3900 m. Extensive primary forests still remain at the site. These comprise temperate sclerophyllous forest above about 3660 m and temperate mixed broadleaved/coniferous and coniferous forests higher up. Between about 4050 and 4200 m the forest had been cut and heavily grazed by yak and reduced to grassland. Yak grazing pressure is now reduced and the habitat is recovering resulting in a mix of thick shrubberies and small herb-rich pastures.

Site 2. Kangding. August 29 to September 3, 2005. Considerably lower in elevation and thus warmer, this site had heavily disturbed habitats – mostly due to livestock grazing. Habitats included conifer-broadleaf mixed forest, secondary broadleaf forest, and Yunnan pine forest at an elevation range of 2392 – 2915 m. This site was mostly covered with secondary forest. The temperate broadleaved forests were heavily logged, mainly in the 1980s and also in the 1990s until 1998. Some of the temperate coniferous forests at the site have also been logged. Some primary temperate coniferous forests remain, but some of these were badly affected by fire around 2000. Most forests, especially broadleaved forests are grazed and broadleaved trees close to the village are badly degraded and reduced to shrubberies with scattered trees.

Site 3. Yajiang. September 6-9, 2005. This site was the highest in elevation of the three sites. There was little to no rain during the survey. Habitats included alpine grassland, alpine shrub, alpine conifer forest, oak forest at an elevation range of 3630-4700 m. There are extensive primary forests, mainly of conifers and also of mixed conifers/broadleaves as well as broadleaved strips along streams and rivers.

Criteria for RAP results

Criteria generally considered during RAP surveys in order to identify priority areas for conservation across taxonomic groups include species richness, species endemism, rare and/or threatened species, and critical habitats. Measurements of species richness can be used to compare the number of species per area among areas within a given region. Measurements of species endemism indicate the number of species endemic to some defined area and give an indication of both the uniqueness of the area and the species that will be threatened by degradation or loss of that area's habitats (or conversely, the species that will likely be conserved through protected areas). Assessment of rare and/or threatened species that are known or suspected to occur within a given area provides an indicator of the importance of the area for the conservation of biodiversity. The presence or absence of such species also aids assessment of their conservation status. Many Red-Listed species carry increased legal protection, thus giving greater importance and weight to conservation decisions. Describing the number of critical habitats or sub-habitats within an area identifies sparse or poorly known habitats within a region that contribute to habitat variety and, therefore, to species diversity.

Results by Site

Danba

Significant findings:

- We recorded the lowest botanical species richness in Danba where much of the vegetation was found to be degraded or destroyed as a result of either natural or human causes. Of the 22 recorded plant species listed in the China Plant Red Data Book, 10 species were found in Danba, including one species listed as Vulnerable on the IUCN Red List (*Gastrodia elata*).
- The Alpine stream salamander, *Batrachuperus tibetanus*, listed by IUCN as Vulnerable was recorded at this site.
- At Danba, 100 bird species were recorded. The number of bird observations made here was much reduced by prolonged rain and low cloud and mist experienced on a few days during the survey. We recorded four globally threatened species, *Lophophorus lhuysii* Chinese Monal (VU), *Bonasa sewerzowi* Chinese Grouse (NT), and *Crossoptilon crossoptilon* White-eared Pheasant (NT) as well as *Perisoreus internigrans* Sichuan Jay (VU), observed only at this site during the RAP survey.
- In Danba, 16 species of small mammals were found. Most species documented at this site are distributed only or mainly in China. Among species recorded were several species listed as threatened according to the 2007 IUCN Redlist, most notably Salenski's shrew (*Soriculus salenskii*) listed as CR and the Greater stripe-backed shrew (*Sorex cylindricauda*), listed as EN, both observed only in Danba County during this survey.
- We observed, identified by tracks, scats, or sound 8 species of large mammals at Danba, including *Capricornis milneedwardsii* Serow (NT) and *Elaphodus cephalophus* Tufted deer (DD). Interviews with local people suggested the possible presence of a total of 28 species of large mammals including *Cuon alpinus* Asian wild dog (EN), *Uncia uncia* Snow leopard (EN), *Ovis ammon* Argali (VU), *Catopuma temminckii* Asian golden cat (VU), *Ursus thibetanus* Asian black bear (VU), and *Lynx lynx* Lynx (NT). Our results suggest that the full biologically rich assortment of large mammals which characterize the high elevation forests of western Sichuan might remain in the greater Danba area. However, the large mammalian fauna here appears to occur in exceedingly low densities and is extremely shy.

Kangding

Significant findings:

- Among the three areas, the greatest botanical richness was recorded in Kangding (1227 spp.). Of the 22 recorded plant species listed in the China Plant Red Data Book, 16 species were found in Kangding, including three species listed as Vulnerable on the IUCN Red List (*Cupressus chengiana*, *Salix magnifica* and *Gastrodia elata*).
- Kangding had the highest species richness for ants (34 species).
- While this site showed the lowest herpetological diversity of the three, we recorded a giant horned toad (*Megophrys* sp.) that we had never found before, possibly new to science. In addition, the Alpine stream salamander, *Batrachuperus tibetanus*, listed by IUCN as Vulnerable was recorded at this site.

- At Kangding, 99 species of birds were recorded. The number of species is less than expected, likely due to the relatively high human population and frequent human activities such as farming and herb collection. Birds here were afraid of people, indicating a weaker conservation consciousness among local villagers. We recorded three globally threatened species, *Lophophorus lhuysii* Chinese Monal (VU), *Bonasa sewerzowi* Chinese Grouse (NT), and *Crossoptilon crossoptilon* White-eared Pheasant (NT).
- In Kangding, 14 small mammal species were documented, including eight species distributed solely or mainly in China. Fewer species of small mammals were documented at this site compared to the other sites, perhaps due to higher levels of human disturbance.
- We observed, identified by tracks, scats, or sound 6 species of large mammals at Kangding, including *Ailurus fulgens* Red Panda (EN), *Capricornis milneedwardsii* Serow (NT), *Ursus thibetanus* Asian black bear (VU), and *Elaphodus cephalophus* Tufted deer (DD). Interviews with local people revealed the possible presence of a total of 25 species of large mammals at Kangding, including *Ailuropoda melanoleuca* Giant Panda (EN), *Cuon alpinus* Asian wild dog (EN), *Budorcas taxicolor* Takin (VU), *Catopuma temminckii* Asian golden cat (VU) and *Rhinopithecus roxellana* Golden monkey (VU). However, the large mammal species occur in exceedingly low densities and seem to be extremely shy in this area.

Yajiang

Significant findings:

- Of the 22 recorded plant species listed in the China Plant Red Data Book, 12 species were found in Yajiang, including one species listed as Vulnerable on the IUCN Red List (*Gastrodia elata*).
- While Yajiang was found to have the lowest ant species richness of the three sites, this higher elevation site with more pristine forests exhibited the highest stability and evenness in the ant community.
- This site showed the highest levels of endemism among beetles. Of the 19-20 beetle species recorded from Yajiang, 15 species are only known to occur in China, and of these, eight are known only from Sichuan Province.
- Hundreds of individuals of a torrent frog (*Amolops* sp.) were found under the rocks near streams and rivers, some were even found in the mountains, hundreds of meters from streams and rivers. Comparing our specimen to other *Amolops* species, a number of apparent morphological differences suggest that further study is necessary to determine the taxonomic status of this species.
- The Alpine stream salamander, *Batrachuperus tibetanus*, listed as Vulnerable and the Plateau frog, *Nanorana pleskei*, listed as Near Threatened by the IUCN were recorded from this site.

- At Yajiang, 104 species of birds were recorded. At this site, the altitudinal range covered by the bird survey group was greater than the range covered at the other two sites. More primary vegetation remains in this area, as the scale and intensity of commercial logging is less than that of the other two sites. Birds here were tame and easy to observe at close range. We recorded three globally threatened species, *Lophophorus lhuysii* Chinese Monal (VU), *Bonasa sewerzowi* Chinese Grouse (NT), and *Crossoptilon crossoptilon* White-eared Pheasant (NT).
- In Yajiang we recorded 18 species, including a new subspecies of Qinghai vole (*Microtus fuscus*), and a range extension for the Greater brown vole (*Eothenomys miletus*) in Yajiang County. Prior to the RAP survey, we predicted this site would have the lowest biodiversity with regard to small mammals, but our results show that this site had a diverse and interesting community of small mammals.
- We observed, identified by tracks, scats, or sound 12 species of large mammals at Yajiang including *Capricornis milneedwardsii* Serow (NT), *Cervus albirostris* White-lipped deer (VU), and *Catopuma temminckii* Asian golden cat (VU). Interviews with local people revealed the possible presence of a total of 30 species of large mammals including *Cuon alpinus* Asian wild dog (EN), *Uncia uncia* Snow leopard (EN), *Ursus thibetanus* Asian black bear (VU), *Lynx lynx* Lynx (NT), *Lutra lutra* Common otter (NT), *Aonyx cinereus* Clawless otter (NT), and *Elaphodus cephalophus* Tufted deer (DD). Our results suggest that the full biologically rich assortment of large mammals which characterize the high elevation forests of western Sichuan might remain in the greater Yajiang area.

Table 1. Number of species documented during the RAP survey of Sichuan Province, China.

	All RAP sites in this survey	Danba	Kangding	Yajiang
Plants	1477	875	1227	1013
Ants	45	16	34	14
Beetles	43	16	20	20
Orthoptera	14	5	7	5
Other Insects	170	36	136	21
Amphibians	10	4	3	6
Reptiles	6	2	4	3
Birds	164	100	99	104
Small mammals	33	16	14	18
Large mammals	17	8	6	12
Total	1979	1078	1550	1216

Results by Taxon

Plants After collection and identification of specimens from all three areas we recorded a total of 1,477 vascular plant species from 517 genera and 133 families. Of these, 92 plant species belonging to 31 genera and 18 families were ferns, 36 plant species belonging to 12 genera and 5 families were gymnosperms, 1,349 plant species belonging to 474 genera and 110 families were angiosperms. Among the three areas, we recorded the greatest richness in Kangding (1227 spp.) followed by Yajiang (1013 spp.). The fewest species were recorded from Danba (875 spp.) where much of the vegetation was found to be degraded or destroyed as a result of either natural or human causes. Among species recorded were 22 species of rare and threatened plants which belong to 21 genera. Plant diversity in the RAP survey sites is relatively high when comparing the numbers of species recorded over a relatively short period of time during this survey with species richness recorded from other nearby areas.

Ants In total, 45 ant species belonging to 4 subfamilies and 17 genera were collected from the three sites: 16 species from Site 1 (Danba); 34 species from Site 2 (Kangding); and 14 species from Site 3 (Yajiang). Among the 45 ant species, 22 species (48.9%) have been positively identified while 23 species (51.1%), including many new species records for China and at least four species new to science, await final identification. The lowest elevation site (Kangding) had highest ant species richness, followed by the Danba site, and lastly the higher elevation Yajiang site. However in terms of ant community composition, the higher elevation Yajiang site with more pristine forests exhibited the highest stability and evenness in the ant community. Several species of the genus *Myrmica* species were found at all three sites. The genus *Formica* is also relatively rich in species and common in distribution. Colonies of the red wood ant (*Formica* sp.) contain thousands of workers and are an important natural enemy for pest insects in alpine conifer forest.

Beetles Coleoptera (primarily the families Silphidae, Leiodidae, Geotrupidae, and Scarabaeidae), were sampled from vertebrate carrion and dung at three sites in Ganzi Prefecture, Sichuan Province, China between 21 August and 9 September 2005. The sites sampled were: (1) Danba County, road S of Donggu town (2-17 km S) along Kui Yong creek valley (2) Kangding County, Pengta Town, Tongling village road up Zhong Gu Lou gou Valley, and (3) Yajiang County, Valley S of Decha village. Identifications to genus or species rank were accomplished for 672 beetle specimens that represent 42-43 species, of which 10-11 are undescribed (24%). These were distributed among the following families: Silphidae (13-14 species, 1-2 new), Leiodidae (9 species, 7 new), Geotrupidae (6 species, 1 new), Scarabaeidae (14 species, 1 new). Fourteen of the 32 described species (44%) are known only from records in China and are, therefore, possibly endemic to China – five of which are known only from Sichuan Province (16%).

Two described geotrupid species known previously only from Yunnan Province are reported from Sichuan Province for the first time (*Enoplotrupes yunnanus* and *Odontotrupes meymintang*). Including the undescribed / newly discovered species, Site 1 had 8 species known only from China, 3 of which were known only from Sichuan Province; Site 2 had 12 species known only from China, 4 of which were known only from Sichuan Province, and

Site 3 had 15 species known only from China, 8 of which were known only from Sichuan Province. Site 3 therefore had the greatest counts of species known only from China and Sichuan Province.

Orthoptera (grasshoppers, crickets and katydids) Only three species of the Tettigoniidae were recorded during the RAP survey, two of which appear to be Sichuan endemics (*Tettigonia chinensis* and *Teratura geniculata*). In addition, the third, widely distributed Palearctic species (*Phaneroptera falcata*) was recorded. All three species of katydids were recorded only at Site 2 (Tongling). Other recorded Orthoptera included two species of Rhaphidophoridae, two Gryllidae, six Acrididae, and one Tetrigidae. One species of *Kingdonella* (Acrididae: Catantopinae) is possibly new to science.

Other Insects We recorded 170 species of insects, belonging to 121 genera, 42 families, and 11 orders. Of these, 136 species were recorded from Kangding County, 36 species from Danba County, and 21 species from Yajiang County. Ten new species recorded during this survey are potentially new to science. Specimens of *Hepialus* sp., the host caterpillar for a fungus that is highly sought after and collected, were not observed during the RAP survey, although the species is known to be distributed in Ganzi Prefecture.

Birds A total of 164 bird species were recorded including six species of Galliformes reported by local villagers. Four globally threatened birds were recorded during the survey including two species listed as Vulnerable, Chinese Monal and Sichuan Jay, and two species listed as Near Threatened, Chinese Grouse and White-eared Pheasant (Birdlife International 2000). Overall, bird species were significantly under-recorded during the RAP survey, partly because the survey was carried out in the post-breeding season for many species. It is also likely that many summer visitors and breeding altitudinal migrants had already departed the site prior to our survey.

At Site 1 (Danba), 100 species of 10 orders and 26 families were recorded. The number of bird observations made at in Danba County was much reduced by prolonged rain and low cloud and mist experienced on a few days during the survey. At Site 2 (Kangding), 99 species of 28 families and 8 orders were recorded. The number of species is less than expected, likely due to the relatively high human population and other frequent human activities such as farming and herb collection. Birds here were afraid of people, indicating a weaker conservation consciousness among local villagers. At Site 3 (Yajiang), 104 species of 28 families and 10 orders were recorded. In Yajiang County, the altitudinal range covered by the bird RAP teams was higher than at the other sites (3650–4400m).

Amphibians and Reptiles Because the season was not suitable for herpetological field surveys, we recorded only 10 species of amphibians and six species of reptiles during 20 days of field work. Our results show that the herpetological diversity was higher at the Danba and Yajiang sites compared to the Kangding site. At Site 2 (Kangding), we collected a giant horned toad (*Megophrys* sp.) that we had never found before which is possibly new to science. Unfortunately, we collected only one specimen. At Site 3 (Yajiang), hundreds of individuals of a torrent frog (*Amolops* sp.) were found under the rocks near streams and rivers, some

were even found in the mountains, hundreds of meters from streams and rivers. Comparing our specimens with other *Amolops* species, the observed species shows a different color pattern, and the tympanum is absent. Further study is needed to confirm the taxonomic status of these two species. Additionally, one recorded species is listed as Vulnerable (Alpine stream salamander, *Batrachuperus tibetanus*) and one as Near Threatened (Plateau frog, *Nanorana pleskei*) by the IUCN (IUCN 2007).

Small Mammals We recorded a total of 33 small mammal species including seven shrew, two bat, 19 rodent and five lagomorph species. We obtained 16, 14 and 18 small mammal records from Danba, Kangding and Yajiang, respectively. In Danba County, 16 species of small mammals were found. Most species documented at this site are distributed only or mainly in China. Among species recorded were several species listed as threatened according to the 2007 IUCN Red List, most notably Salenski's shrew (*Soriculus salenskii*) listed as Critically Endangered and the Greater stripe-backed shrew (*Sorex cylindricauda*), listed as Endangered, both observed only in Danba County during this survey. In Kangding County, 14 small mammal species were documented, including eight species distributed uniquely or mainly in China. Fewer species of small mammals were documented at this site compared to the other sites, perhaps due to higher levels of human disturbance. In Yajiang County we captured 18 species, including the first record of the South white-toothed shrew (*Crocidura horsfieldi*) for Ganzi Prefecture, a new subspecies of Qinghai vole (*Microtus fuscus*), and range extensions for several species, including the Greater brown vole (*Eothenomys miletus*) in Yajiang County. Prior to the RAP survey, we predicted that this site would have the lowest biodiversity of small mammals but the result show that this site had a diverse and interesting community of small mammals.

Large Mammals We present the results of a large mammal survey performed during a Rapid Assessment Program (RAP) survey conducted at three sites in the Heng Duan Mountains, Sichuan, China from August 21 to September 12, 2005. To survey for the presence of large mammals we used three methodologies: (1) tracks, scats, sounds, and visual observations, (2) interviews with local people, and (3) camera phototraps. We suspect the presence of 39 large mammal species and confirmed 17 species in the region. Of the mammals recorded, one is listed as Endangered (*Ailurus fulgens*) and three are considered Vulnerable (*Cervus albirostris*, *Catopuma temminckii*, and *Ursus thibetanus*) by the IUCN. Interviews with local people suggested that an additional three species listed as Endangered and three listed as Vulnerable are likely to occur in the area.

While all three sites were heavily utilized for grazing domestic stock such as yaks, horses, and goats, each of three sites was impacted differently by the local people. We found no evidence of blue sheep or bears at any sites. Our evidence suggests that some of the sites we sampled still contain large mammal species characteristic of western Sichuan, but in very low densities thus supporting the need for immediate conservation action for long-term protection. Further surveys are necessary to confirm or refute the presence of Argali, Tibetan gazelles, brown bears, wolves, and snow leopards.

Table 2. Animal species of conservation concern recorded during the 2005 RAP survey in Sichuan Province, China (IUCN 2007).

Taxon	Species Name	Common Name	Conservation Status	RAP Survey Site		
				Danba	Kangding	Yajiang
Mammal	<i>Soriculus salensis</i>	Salenski's shrew	CR	x		
Mammal	<i>Ailurus fulgens</i>	Red Panda	EN		x	
Mammal	<i>Sorex cylindricauda</i>	Greater stripe-backed shrew	EN	x		
Amphibian	<i>Batrachuperus tibetanus</i>	Alpine stream salamander	VU	x	x	x
Bird	<i>Lophophorus lhuysii</i>	Chinese Monal	VU	x	x	x
Bird	<i>Perisoreus internigrans</i>	Sichuan Jay	VU	x		
Mammal	<i>Capricornis milneedwardsii</i>	Serow	NT	x	x	x
Mammal	<i>Catopuma temminckii</i>	Asian golden cat	VU			x
Mammal	<i>Cervus albirostris</i>	White-lipped deer	VU			x
Mammal	<i>Ursus thibetanus</i>	Asian black bear	VU		x	
Mammal	<i>Eospalax fontanierii</i>	Highland zokor	VU		x	
Mammal	<i>Eozapus setchuanus</i>	Sichuan jumping mouse	VU	x		x
Amphibian	<i>Nanorana pleskei</i>	Plateau frog	NT			x
Bird	<i>Bonasa sewerzowi</i>	Chinese Grouse	NT	x	x	x
Bird	<i>Crossoptilon crossoptilon</i>	White-eared Pheasant	NT	x	x	x

Conservation Recommendations

General Threats to Biodiversity in the region

Grazing

Present grazing practices are likely having a long-term, negative impact on many species of wildlife and are not sustainable for domestic livestock production. As the rural population grows, the number of households will increase and so will community pressure on grazing lands. Allowing the present grazing management system to continue is inviting more domestic livestock disease outbreaks that will negatively impact humans and wildlife alike. Review and revision of domestic livestock management practices is thus vital not only to support sustainable livestock production but also to preserve the biodiversity of western Sichuan. Viewed this way, a grazing management practice designed to benefit humans will likely be beneficial to wildlife as well. We recommend that the local forestry bureau take measures to control unsustainable grazing practices and put in place measures to reduce the influence to wildlife that results from the grazing of domestic livestock.

Human Population Growth

Human population density of some areas in and around the RAP survey sites is relatively high and is likely to increase. More abundant human populations put pressure on local natural resources as people look to the forests as sources of timber, firewood, grazing land, medicinal plants, and agricultural expansion. We encourage the local government to integrate protection of local biodiversity and habitats into all development activities, including regulation of human immigration and land use.

Recommended Actions

Integration of Forest Protection with Tibetan Culture

The positive effects of the local Buddhist religion on wildlife protection should be more widely recognized and promoted. The local Tibetan people generally do not hunt wildlife, especially in the sacred mountains. Efforts to protect biodiversity, by revitalizing Tibetan cultural values and by expanding the scale of the traditional protection system among Tibetan communities, such as the Sacred Lands Project initiated by Conservation International and its partners, should be integrated into local land planning and management activities. Local Buddhist monasteries and Tibetan villages should be involved in making land use decisions.

Specific Recommendations for Danba County:

- We strongly recommend establishing a nature reserve based on the Sacred Dingguoshan Mountain. This will greatly contribute to conservation of biodiversity and ethnic cultures of this region. The sacred Dingguoshan Mountain plays an important role in conservation of forests and wildlife in this region. The forests on Dingguoshan Mountain are in good condition and we saw many wildlife trails in the forest. The population density of local people is quite low and the vegetation is recovering well from past logging, therefore this site has high protection value.
- Since the logging ban in 1998, the forests have been fairly well protected along the upper Dongmagou Valley. Plant communities in the alpine habitat mosaic are increasing their coverage. We recommend continuing a ban on logging in this area.

- We recommend further surveys to confirm the possible presence of Argali sheep at this site. This site is far from their current known distribution but local people informed us that they had observed these sheep in the area.

Specific Recommendations for Kangding County:

- A conservation management plan is needed to protect the remaining biodiversity in this area. The forests here have been greatly disturbed over the past 30 years due to commercial logging, and currently the population density and impact of local people is high. Secondary, deciduous forests are common in this region, but are recovering their cover and structure in areas not currently disturbed by humans. We suggest the delimitation of multiple use areas for local people and strengthened protection measures to preserve key areas still containing healthy forest and biodiversity.
- In the third Giant Panda Survey (State Forestry Administration, 2006), Giant pandas were found in this area. We suggest that all protected areas in Kangding county be designed to specifically include preservation of Panda habitat.
- Grazing control is especially needed in Kangding as grazing pressure is very heavy in sub-alpine and alpine areas here, especially in the borders between Kangding and Xiaojin counties. Such overgrazing results in a lower alpine tree line and poor diversity of plant communities. There are several pastures at low elevations that affect the habitats of small mammals. Policies adapted to both animal husbandry and biodiversity conservation should be developed and implemented in this area.
- Future logging should be regulated and controlled. This area displayed little small mammal diversity with large populations of a few species that are tolerant of human disturbance, indicating that logging may have a serious impact on small mammal populations here.
- In this area there is a valuable fungus sold by local people whose host caterpillar, *Hepialus* sp., is highly sought after and collected. Over-collecting threatens the survival of the species. Although we found evidence of this action only at lower elevations and impact to local wildlife appeared to be low, we recommend regulation of collection of this insect to protect its populations and to reduce disturbance to its habitats.

Specific Recommendations for Yajiang County:

- This site contained the highest quality forest and most pristine habitats of the three RAP sites surveyed. We strongly recommend that this site be protected as a high priority before it is impacted by humans. The strong consciousness of the local Tibetan people toward protecting their environment has kept this area in good condition and should make protection of this site possible. This site has important conservation value and scientific significance for the sustainable protection of biodiversity in the area. Establishment of a nature reserve to protect these alpine and sub-alpine ecosystems is strongly recommended.

- Grazing is a traditional practice for Tibetan people living in this region, but often leads to undesirable impacts on ecosystems. Compared to other less disturbed mountains in the same region, the tree line here is descending from 4,400 to 3,900 m in overgrazed areas, thus we recommend a reduction in grazing intensity in such areas.
- Wildlife in Yajiang was more easily observed than at the other sites we visited. Also, bird watching was comparable to productive areas in Nepal (C. Inskipp personal communication). Therefore, economic development of ecotourism in Yajiang should be explored.

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