# Large Mammals

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# Chapter 9

## Large Mammals

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### Summary

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.


### Materials and Methods

We conducted our surveys at the end of the wet season at three sites in western Sichuan: Danba, Dongma, Kuiyong (N 30o 36', E 101o 47') from August 21 to August 26, 2005, Kangding, Pengta (N 30o 30', E 102o 20') from August 29 to September 3, 2005, and Yajiang, Decha (N 29o 40', E 100o 46) from September 5 to September 9, 2005. Henceforth, we refer to these sites as Danba, Kangding, and Yajiang, respectively. The elevation range surveyed in Danba, Kangding, and Yajiang was 3000 – 4300 m, 2300 – 3900 m, and 3600 – 4600 m, respectively. At Danba the forest was conifer - oak-bamboo and treeline was approximately 4300 m. The second site at Kangding was lower elevation consisting of conifer – secondary broadleaf – oak forests to oak forests and grasslands at 3900 m. Yajiang vegetation was conifer – oak and grasslands up to 4600 m. All sites were utilized to graze yaks, horses, and goats. Due to abnormally high rainfall throughout western Sichuan, interior forests streams were flowing with unusually high volumes of water for this time of year. We surveyed two sites 6 km apart at Danba but present the combined results for this site.

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 at each of the three study sites. Because these methods provide different confidence levels, all results are presented separately. To determine presence of large mammalian species, each day during daily excursions from base camp we recorded direct observation of species along with track and sound identification, nests, dung and other indirect information. Because our records were also collected opportunistically by our colleagues and some observations may have been repeated, we used this information only to document species presence.

We also interviewed local people using Wang and Hu 1999 as a guide. Small groups of between one and five people were asked to page through the book and select which mammals they had observed in the past five years. We avoided making comments that might influence their decisions, and no time pressure was used to coerce responses.

Table 9.1. Wang Hao and James G. Sanderson

| Site name | Date (2005) | Observer | Time | Elev. | Long | Lat | Common Name | Trace Type | Qty | Freshness | Habitat | Long D | Long M | Long S | Lat D | Lat M | Lat S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (D) Dongma | 22-Aug | JS, WH, DJ | 11:56 | 3540 | 101.78569 | 30.61366 | Tufted deer | Scat | 1 | Old | TBM, SF, R | 101 | 47 | 8.5 | 30 | 36 | 49.2 |
| (D) Dongma | 22-Aug | JS, WH, DJ | 13:34 | 3800 | 101.80571 | 30.61221 | Brown bear | Scat | 1 | Old | TBM, SF, RD | 101 | 48 | 20.6 | 30 | 36 | 44.0 |
| (D) Dongma | 22-Aug | JS, WH, DJ | 17:00 | 3810 | 101.80646 | 30.61217 | Wild pig | Scat | 1 | Old | TBM, SF, F | 101 | 48 | 23.3 | 30 | 36 | 43.8 |
| (D) Dongma | 22-Aug | JS, WH, DJ | 17:50 | 3690 | 101.79276 | 30.61358 | Leopard cat | Scat | | Mixed with fresh and old | TBM, SF, R | 101 | 47 | 33.9 | 30 | 36 | 48.9 |
| (D) Kuiyong | 23-Aug | WH, LS, DJ | 10:30 | 2750 | 101.7356 | 30.60513 | Tufted deer | alive | 1 | Dir | TBM, SF, RS | 101 | 44 | 8.2 | 30 | 36 | 18.5 |
| (D) Kuiyong | 24-Aug | WH, DJ | 11:54 | 2980 | 101.75828 | 30.56433 | Eurasian badger | Dead body | 1 | 3-10 days | TBM, SF, RD | 101 | 45 | 29.8 | 30 | 33 | 51.6 |
| (D) Kuiyong | 24-Aug | WH, DJ | 14:04 | 3300 | 101.7366 | 30.54372 | Serow | Footprints | 1 | 1-2 days | TBM, SF, RV | 101 | 44 | 11.8 | 30 | 32 | 37.4 |
| (D) Kuiyong | 24-Aug | WH, DJ | 16:14 | 3330 | 101.73718 | 30.54471 | Serow | Skull | 1 | Old | TBM, SF, RV | 101 | 44 | 13.8 | 30 | 32 | 41.0 |
| (D) Kuiyong | 25-Aug | WH | 14:30 | 3310 | 101.78378 | 30.5145 | Serow | Scat | 1 | Old | TBM, SF, R | 101 | 47 | 1.6 | 30 | 30 | 52.2 |
| (D) Kuiyong | 25-Aug | WH | 14:30 | 3310 | 101.78378 | 30.5145 | Leopard cat | Scat | 1 | Old | TBM, SF, R | 101 | 47 | 1.6 | 30 | 30 | 52.2 |
| (D) Kuiyong | 25-Aug | WH | 14:30 | 3310 | 101.78378 | 30.5145 | Rhesus macaque | Scat | 1 | Old | TBM, SF, R | 101 | 47 | 1.6 | 30 | 30 | 52.2 |
| (D) Kuiyong | 25-Aug | WH | 14:30 | 3310 | 101.78378 | 30.5145 | Forest musk deer | Scat | 1 | Old | TBM, SF, R | 101 | 47 | 1.6 | 30 | 30 | 52.2 |
| (D) Kuiyong | 26-Aug | WH, DJ | 14:08 | 3460 | 101.78876 | 30.50568 | Leopard cat | Scat | 2 | 1-2 days | TBM, SF, RD | 101 | 47 | 19.5 | 30 | 30 | 20.4 |
| (D) Kuiyong | 26-Aug | WH, DJ | 14:08 | 3460 | 101.78876 | 30.50568 | Leopard cat | Dead body | 1 | 3-10 days | TBM, SF, RD | 101 | 47 | 19.5 | 30 | 30 | 20.4 |
| (D) Kuiyong | 26-Aug | WH, DJ | 15:18 | 3570 | 101.78631 | 30.49485 | Leopard cat | Scat | 1 | 3-10 days | TBM, SF, F | 101 | 47 | 10.7 | 30 | 29 | 41.5 |
| (K) Pengta | 29-Aug | JS, WH | 10:19 | 2560 | 102.31647 | 30.48336 | Wild pig | Feeding | 1 | 1-2 days | TBM, SF, RD | 102 | 18 | 59.3 | 30 | 29 | 0.1 |
| (K) Pengta | 29-Aug | JS, WH | 13:57 | 3050 | 102.33508 | 30.47483 | Tufted deer | Footprints | 1 | 1-2 days | TBM, SF, F | 102 | 20 | 6.3 | 30 | 28 | 29.4 |
| (K) Pengta | 29-Aug | JS, WH | 15:09 | 3120 | 102.33482 | 30.47552 | Asian black bear | Scat | 1 | 1-2 days | TBM, SF, F | 102 | 20 | 5.4 | 30 | 28 | 31.9 |
| (K) Pengta | 30-Aug | JS, WH | 12:18 | 2830 | 102.34049 | 30.53114 | Goral | Scat | 3 | 3-10 days | TBM, SF, R | 102 | 20 | 25.8 | 30 | 31 | 52.1 |
| (K) Pengta | 30-Aug | JS, WH | 12:18 | 2830 | 102.34049 | 30.53114 | Red panda | Scat | 2 | Over 10 days | TBM, SF, R | 102 | 20 | 25.8 | 30 | 31 | 52.1 |
| (K) Pengta | 31-Aug | JS, WH | 12:00 | 3100 | 102.33173 | 30.48923 | Wild pig | Feeding | 1 | 3-10 days | TBM, SF, FW | 102 | 19 | 54.2 | 30 | 29 | 21.2 |
| (K) Pengta | 31-Aug | JS, WH | 12:23 | 3130 | 102.33271 | 30.48797 | Serow | Footprints | 1 | 1-2 days | TBM, SF, RV | 102 | 19 | 57.8 | 30 | 29 | 16.7 |
| (Y) Decha | 6-Sep | WH | 10:00 | 3700 | 100.75794 | 29.6778 | Forest musk deer | alive | 2 | Dir | TBM, PF, F | 100 | 45 | 28.6 | 29 | 40 | 40.1 |
| (Y) Decha | 6-Sep | WH | 10:07 | 3720 | 100.76599 | 29.67564 | Forest musk deer | Scat | 1 | 1-2 days | TBM, PF, RD | 100 | 45 | 57.6 | 29 | 40 | 32.3 |
| (Y) Decha | 6-Sep | WH | 12:06 | 3880 | 100.77467 | 29.67536 | Alpine musk deer | alive | 1 | Dir | TBM, PF, F | 100 | 46 | 28.8 | 29 | 40 | 31.3 |
| (Y) Decha | 6-Sep | WH | 13:00 | 3960 | 100.77682 | 29.67727 | Sambar deer | Scat | 1 | 3-10 days | TBM,PF,F, RV | 100 | 46 | 36.6 | 29 | 40 | 38.2 |

| Site name | Date (2005) | Observer | Time | Elev. | Long | Lat | Common Name | Trace Type | Qty | Freshness | Habitat | Long D | Long M | Long S | Lat D | Lat M | Lat S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (Y) Decha | 6-Sep | WH | 13:35 | 3950 | 100.77364 | 29.67687 | Forest musk deer | Scat | 1 | unknown | TBF, PF, F | 100 | 46 | 25.1 | 29 | 40 | 36.7 |
| (Y) Decha | 6-Sep | WH | 13:35 | 3950 | 100.77364 | 29.67687 | Serow | Scat | 1 | unknown | TBF, PF, F | 100 | 46 | 25.1 | 29 | 40 | 36.7 |
| (Y) Decha | 7-Sep | JS, WH | 9:18 | 3870 | 100.7485 | 29.65833 | Serow | Scat | 1 | 3-10 days | TBF, SF, RV | 100 | 44 | 54.6 | 29 | 39 | 30.0 |
| (Y) Decha | 7-Sep | JS, WH | 9:59 | 4000 | 100.74122 | 29.65275 | Asian golden cat | Scat | 2 | Mixed with fresh and old | TBF, SF, RV, P | 100 | 44 | 28.4 | 29 | 39 | 9.9 |
| (Y) Decha | 7-Sep | JS, WH | 10:49 | 4170 | 100.73503 | 29.64587 | Asian golden cat | Scat | | Mixed with fresh and old | TBF, SF, RV, P | 100 | 44 | 6.1 | 29 | 38 | 45.1 |
| (Y) Decha | 7-Sep | JS, WH | 15:28 | 4070 | 100.73953 | 29.65035 | Porcupines | Hair | 2 | within 1 day | TBF, SF, F | 100 | 44 | 22.3 | 29 | 39 | 1.3 |
| (Y) Decha | 8-Sep | JS, WH | 11:05 | 3930 | 100.71298 | 29.71622 | Forest musk deer | Scat | 1 | 1-2 days | TBM,PF,S | 100 | 42 | 46.7 | 29 | 42 | 58.4 |
| (Y) Decha | 8-Sep | JS, WH | 11:05 | 3930 | 100.71298 | 29.71622 | Wild pig | Nest | 1 | Old | TBM,PF,S | 100 | 42 | 46.7 | 29 | 42 | 58.4 |
| (Y) Decha | 8-Sep | JS, WH | 11:38 | 4000 | 100.714 | 29.71748 | White-lipped deer | Scat | many | Old | TBM, PF, R | 100 | 42 | 50.4 | 29 | 43 | 2.9 |
| (Y) Decha | 8-Sep | JS, WH | 11:38 | 4000 | 100.714 | 29.71748 | Alpine musk deer | Scat | 1 | 3-10 days | TBM, PF, R | 100 | 42 | 50.4 | 29 | 43 | 2.9 |
| (Y) Decha | 8-Sep | JS, WH | 12:16 | 4100 | 100.71381 | 29.7185 | Goral | Scat | 1 | 3-10 days | TBM, PF, F | 100 | 42 | 49.7 | 29 | 43 | 6.6 |
| (Y) Decha | 8-Sep | JS, WH | 12:55 | 4150 | 100.71495 | 29.71848 | Wild pig | Nest | 1 | Old | TBM,PF,S (in F) | 100 | 42 | 53.8 | 29 | 43 | 6.5 |
| (Y) Decha | 8-Sep | JS, WH | 13:45 | 4100 | 100.71457 | 29.71808 | Wild pig | Scat | many | Old | TBM, PF, R | 100 | 42 | 52.5 | 29 | 43 | 5.1 |
| (Y) Decha | 8-Sep | JS, WH | 14:25 | 3900 | 100.71379 | 29.71463 | Porcupines | Hair | 1 | unknown | TBM, PF, F | 100 | 42 | 49.6 | 29 | 42 | 52.7 |
| (Y) Decha | 9-Sep | WH | 13:15 | 3900 | 100.7784 | 29.66199 | Eurasian badger | Scat | 1 | 1-2 days | TBM, SF, RD | 100 | 46 | 42.2 | 29 | 39 | 43.2 |
| (Y) Decha | 9-Sep | WH | 14:54 | 4000 | 100.78013 | 29.66242 | Himalayan marmot | Den | 1 | Old | G | 100 | 46 | 48.5 | 29 | 39 | 44.7 |

Legend
Site Name D:Danba K:Kangding Y :Yajiang
Observer DJ:Daniel Juhn JS:James Sanderson WH:Wang Hao
Freshness Dir Direct observation
Habitat F:Inside forest FW:Forest window G:Grassland P:Path PF:Primary Forest
R:Beside rocks RD:Along Road RV:Riverside S:Shrub SF:Secondary Forest
TBF:Temperate Broadleaf Forests TBM:Temperate Broadleaf and Mixed Forests

The passive method included the use of nine camera phototraps (PhotoScout, Huntsville, Alabama, USA; Trapacamera, Saõ Paulo, Brazil; and Cuddeback Digital, DeerCam, Park Falls, Wisconsin, USA) operated at each study site. All three phototrap models were triggered by heat-in-motion. Each PhotoScout and Trapacamera used a standard 35mm camera set on autofocus and loaded with ASA 200 print film. Cameras were set to operate continuously and to wait a maximum of 60 seconds between photographs. Cameras were placed at sites suspected of being frequented by various mammalian species. Den sites, trails, and feeding or drinking stations were typically chosen for camera placement. Cameras were typically located at least 500 meters from base camp. For shy mammals under severe hunting pressure, camera trapping methods might be more effective than walking transects, especially when observers have different and varied levels of expertise.

Table 9.2. Mammals photographed by camera traps at each of three China RAP sites.

| Site | | Number of Cameras | Duration | Total Camera nights | Person to set | Wildlife captured |
|---|---|---|---|---|---|---|
| Danba | Dongma | 6 | Aug 22 - Aug 26 | 24 | JS, Wang Hao, DJ | - |
| | Kuiyong | 4 | Aug 24 - Aug 26 | 8 | AS | - |
| Kangding | Mid road | 3 | Aug 29 - Sept 2 | 12 | JS, Wang Hao, Wang Dayong, Nima | Rhesus macaque |
| | Lower road | 1 | Aug 31 - Sept 2 | 2 | JS, Wang Hao, Wang Dayong | - |
| Yajiang | Sacred Mts. | 4 | Sept 6 - Sept 10 | 16 | JS, Nima | Eurasian Badger |
| | Valley near Camp | 5 | Sept 6 - Sept 10 | 20 | Wang Hao, Jiang Wei | Alpine Musk Deer |

Observers: DJ: Daniel Juhn; JS: James Sanderson; AS: Anne Savage

## Results

We observed, identified by tracks, scats, or sound 8, 6, and 12 species of large mammals at Danba, Kangding, and Yajiang, respectively (Table 9.1, Appendix 6). Interviews of local people revealed the possible presence of a total of 28, 25, and 30 species of large mammals at Danba, Kangding, and Yajiang, respectively (Table 9.1). No camera trap photographs were taken at Danba during 32 camera-trap days. During 14 camera-trap days at Kangding a Rhesus macaque (*Macaca mulatta*) was photographed. At Yajiang camera phototraps recorded the presence of Alpine musk deer (*Moschus sifanicus*) and Eurasian badger (*Meles meles*) during 36 camera-trap days (Table 9.2).

We observed alive only five wild large mammals during our surveys: one Alpine musk deer (*Moschus sifanicus*) at Danba and another at Yajiang, one Forest musk deer (*Moschus berezovshii*) at Yajiang, one Tufted deer (*Elaphodus cephalophus*) at Danba, and a Eurasian badger (*Meles meles*) at Yajiang. Despite frequent searches of the mountain tops we were unable to confirm the presence of Blue sheep (*Pseudois nayaur*) and Brown bear (*Ursus acrtos*). The presence of Asian black bear (*Selenarctos thibetanus*) is based on a single paw track at Yajiang. Based on observations of several scats we suspect the possible presence of golden cat (*Catopuma temminckii*) at Yajiang.

## Discussion

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 and Yajiang areas. However, the large mammalian fauna appears to occur in exceedingly low densities and is extremely shy, particularly at Danba and Kangding.

Table 9.3. The number of threatened mammals documented at each of 3 sites (IUCN 2006).

| Site | Methods | Endangered (EN) | Vulnerable (VU) |
|---|---|---|---|
| **Site 1: Danba** | Camera Trap | - | - |
| | Survey | - | 2 |
| | Interview | 2 | 8 |
| **Site 2: Kangding** | Camera Trap | - | - |
| | Survey | 1 | 2 |
| | Interview | 3 | 7 |
| **Site 3: Yajiang** | Camera Trap | - | - |
| | Survey | - | 4 |
| | Interview | 1 | 7 |

According to the current IUCN Red List (IUCN 2006) four species recorded or reported to occur in the area during our survey are listed as Endangered: Snow leopard (*Uncia uncia*), Giant Panda (*Ailuopoda melanoleuca*), Red panda (*Ailurus fulgens*), and Asian wild dog (*Cuon alpinus*). Four recorded or reported species are listed as Vulnerable: Asian golden cat (*Catopuma temminckii*), Takin (*Budorcas taxicolor*), Argali (*Ovis ammon*), and White-lipped deer (*Cervus* ). The remaining species recorded including Leopard (*Panthera pardus*), Goral (*Naemorhedus goral*), Forest musk deer (*Moschus berezovskii*), Alpine musk deer (*Moschus chrysogaster*), Tibetan fox (*Vulpes ferrilata*), Lynx (*Lynx lynx*), Common otter (*Lutra lutra*), and Clawless otter (*Aonyx cinereus*) are listed as Lower Risk or Least Concern. The presence of threatened species, particularly those listed as Endangered, make these forests critical

to both regional and global biodiversity (Table 9.3). The Tibetan gazelle (*Procapra picticaudata*) is considered Low Risk/Near Threatened but likely requires re-evaluation. The gazelle is an icon of the rich and threatened fauna of western Sichuan. The possible existence of this species at Yajiang is an exciting possibility that should be investigated further. The possible presence of Argali at Danba is based upon an interview. There is no evidence to support the presence of the endemic Chinese mountain cat (*Felis bieti*) at the sites we surveyed nor did any of the local Tibetans recognize the cat as they do elsewhere where the cat occurs (He et al. 2004, Chen et al. 2005).

Because only three camera trap pictures of native animals were obtained, discussion of photographic rates is not useful. However, that so few photographs were obtained suggests that wildlife occurs in low densities or is extremely shy at the sites we surveyed. Although we found a catapult at Kangding and a single snare trap typical of those used to capture musk deer was found at Yajiang, we found no evidence of widespread direct persecution of wildlife. This could be because wildlife occurs in such low densities that hunting is simply not worth the effort. However, the anti-poaching efforts of government and local communities have recently been enhanced, and a nation-wide effort by the Chinese government to limit the number of guns held by local people has been successful. Yaks, horses, and, to a lesser extent, goats appear to be quite numerous and utilize all of the available grazing land up to the limit of grass at the highest elevation.

Under the present rules regulating grazing practices each household pays a very low rate per animal to graze as much livestock as they can manage. This suggests a "tragedy of the commons" situation whereby every household grazes as much livestock as possible thereby encouraging widespread overgrazing over as large an area as can be managed by a family. In effect, no domestic rangeland management practices exist. At Kangding, for instance, we were informed that more than 100 yaks died of disease in 2004. The possibility of overgrazing by domestic livestock and the presence of wildlife sharing pastures with domestic livestock cannot be good for either humans or wildlife and is likely not sustainable.

Local pressure on forest resources for fuel wood, building of homes, shops, public buildings, and monasteries supports the conversion of forest to pasture. Once cleared of trees, domestic animals likely maintain these grasslands. For instance, at Kangding in a forest patch adjacent to a pasture we found little recruitment of trees. Tree recruitment by villagers is supported by the so-called *Grain-for-Green program*. However, tree replanting takes place in unused agricultural patches nearest the village while trees are harvested in the forest beyond the village. Though our observations were not systematic we suggest that further investigation of tree replanting efforts is necessary. For instance, tree replanting might achieve better long-term results if replanting was done in the forest when mature trees are harvested.

Our results are suggestive of and consistent with the so-called *empty forest syndrome* whereby large mammal populations are, one by one, reduced in density and become "ecologically extinct" from large areas (Redford 1992). An ecologically extinct species is one that continues to exist, but the population of the species is so low that the ecological role of the species is irrelevant. The cause of this slow but inevitable extinction might be due to unmitigated grazing practices rather than direct persecution. However, our results also suggest the full biologically rich assortment of large mammals might *at this time* still be present (albeit in very low densities over a vast area) and that this biodiversity can be stabilized and brought back if proper grazing management and forestry practices are implemented with sustainability as the goal.

## Conservation Recommendations

Present grazing and to a lesser extent tree harvesting 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. Moreover, this negative impact is multiplied because each household has at least five domestic animals. When the distance people travel by foot in a day to search for their livestock is reached (as is likely the case already) forest clearing to support domestic livestock production will increase (or the number of livestock held by each household will decrease – an unlikely possibility). Once the land is cleared of forest, domestic livestock will maintain the pastures. Tree replanting efforts can also be improved with little effort.

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 large mammalian biodiversity of western Sichuan. Viewed this way, a grazing management practice designed to benefit humans will likely be beneficial to wildlife as well.

Further surveys are necessary to confirm the possible existence of Argali sheep at Danba. This is far from their known distribution but local people informed us that they had observed this species in the area. Wildlife in Yajiang was more easily observed than at the other sites we visited. Therefore, economic development of ecotourism in Yajiang should be explored.

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