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Failure to detect the Chinese giant salamander (*Andrias davidianus*) in Fanjingshan National Nature Reserve, Guizhou Province, China

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The Chinese giant salamander, *Andrias davidianus* BLANCHARD, 1871 (Caudata: Cryptobranchidae), is the world's largest amphibian. It is endemic to China and is currently listed as Critically Endangered by the IUCN (LIANG et al. 2004) and ranked as the number 2 global priority for amphibian conservation on the basis of threat and evolutionary history by the Zoological Society of London's Evolutionarily Distinct and Globally Endangered (EDGE) programme (ISAAC et al. 2012). Wild populations are threatened and some have already become extinct (WANG et al. 2004). Population declines have been attributed to habitat loss and fragmentation, and especially hunting for luxury food markets and potentially to stock salamander farms (WANG et al. 2004, FENG et al. 2007, DAI et al. 2009, LIANG et al. 2004). *Andrias davidianus* is particularly vulnerable to overexploitation due to its slow growth and age at which it attains sexual maturity; generation length has been estimated to be 15 years (LIANG et al. 2012).

Guizhou Province, located in southwestern China, is considered an important region for *A. davidianus*, with wild populations recorded historically from 30 counties in the province (FEI et al. 2006). Fanjingshan National Nature Reserve (FNNR) is 41,900 ha in size and characterised by a mid-subtropical montane moist monsoon climate. The reserve was established in 1978 specifically to protect *A. davidianus* as well as other threatened species (UNESCO 2013). The core area of FNNR contains approxi-

mately 1,100 people, with a further 15,000 people living in the buffer zone surrounding the reserve. It is situated in one of the poorest areas in China, but is currently experiencing extensive development for national-scale tourism (UNESCO 2013). FNNR was chosen as a study site because *A. davidianus* has been recently recorded from the reserve (Global Environment Facility 2004, ZHANG 2008) and the relatively undisturbed rocky streams and small rivers running through forest provide optimal habitat for giant salamanders.

There are no published data on the seasonal activity periods of wild *A. davidianus*, so field surveys were timed to coincide with peak activity periods of the closely related *A. japonicus* documented by TAGUCHI (2006). FNNR was visited in May 2013, a time of year when we suspected that *A. davidianus* would be active and beginning their breeding season. From 8–15 May, we surveyed two of the major river systems (Panxi and Heiwan) within the core and buffer zone of FNNR (Fig. 1). Our aims were to collect data on the relative abundance of wild *A. davidianus* and its habitat and to train Chinese biologists in field survey techniques. The Panxi and Heiwan rivers were selected as they are known to have supported populations of *A. davidianus* in the recent past (Global Environment Facility 2004). While the Heiwan River is accessible via a tourist road for sight-seeing, the Panxi River is much less accessible and further away from human disturbance.

Night-time surveys were conducted during known peak activity times (20:00–01:00 hrs) of *A. davidianus* (LIANG & WU 2010) to ensure we had the greatest chance of detecting individuals. Survey teams consisted of 4–7 people, and three of the researchers had prior experience of surveying cryptobranchid salamanders. We surveyed three 100 m sections along the Panxi River within the core zone of FNNR at approximately 600 m above sea level, and three 1 km sections along the Heiwan River within the core zone and one 50 m stretch in the buffer zone. Survey sites on the Heiwan River ranged from 600–1,000 m above sea level. We followed several recommended giant salamander field survey techniques, including wading, turning substrate, net-

ting, snorkelling, nocturnal spotlighting, and baited traps (described by BROWNE et al. 2011). To prevent the spread of pathogens between sites, powder-free nitrile gloves were worn at all times and were changed between sites. Equipment, footwear and vehicle tyres were disinfected with Virkon S between sites.

Despite a cumulative 1,388 trapping hours, 62.7 person hours of day-time wading, turning substrate, netting and snorkelling, and 66 person hours of night-time spotlighting and snorkelling, we failed to encounter *A. davidianus* in either the Panxi River or the Heiwan River. The habitat in surveyed sections of both the Panxi and Heiwan rivers appeared optimal and undisturbed and there was ample



Figure 1. Map of Fanjingshan National Nature Reserve. The Heiwan and Panxi rivers were surveyed for *Andrias davidianus*.

food available for *A. davidianus*, but we found evidence of ongoing hunting pressure on *A. davidianus* within FNNR. Eight bow hooks, which are traditionally used in China to hunt *A. davidianus* (WANG et al. 2004, BROWNE et al. 2011), were discovered along the Heiwan River at two sites supporting optimal microhabitat for the species (clear, cool, slow to swift flowing mountain streams of pH 6.0–7.0 that had caves in rocky banks, and with good forest cover and in steep valleys; WANG et al. 2004).

In addition to visual encounter surveys, a standardised formal questionnaire survey was conducted by trained native Chinese speakers in 16 small rural communities located within the core and buffer zones of FNNR. The results of this and other villager surveys are currently being analysed and will be presented in detail elsewhere, but of 99 people interviewed only two reported having seen wild *A. davidianus* in FNNR within the previous 18 months. Formal interviews and informal discussions with villagers indicated that nocturnal spotlighting for wild *A. davidianus* is still carried out in FNNR. Two interviewees reported that wild *A. davidianus* were caught specifically for sale in neighbouring Guangdong Province, indicating the possibility that poaching in FNNR is part of a wide-scale trade network.

Our failure to detect *A. davidianus* in the Heiwan and Panxi rivers of FNNR and the presence of ongoing poaching of this protected species in a protected area highlights the need for radically improved and strengthened conservation management of *A. davidianus* in FNNR, and possibly elsewhere in China. We suggest that this is achieved through raising the profile of *A. davidianus* in communities within the range of the species and amongst tourists visiting protected areas with historical or existing *A. davidianus* populations, as well as through regular night-time patrols of the river systems that contain *A. davidianus* by protected area staff. Further visual encounter and villager surveys are required throughout the historical range of *A. davidianus* in order to assess the current distribution and abundance of this Critically Endangered species and the degree to which it is still threatened by illegal hunting.

Summary

贵州省位于中国西南部的亚热带地区，是中国大鲵的主要产地之一，在该省的30多个县拥有野生大鲵的历史分布记录。梵净山国家级自然保护区是贵州省有大鲵分布的重要保护区之一。2013年5月，我们调查了该保护区核心区及缓冲区的两条主要河流，分别是盘溪河的300M河段及黑湾河的3.2KM河段。尽管两条河流均有大鲵理想的生境，如人为干扰少，饵料充足，但调查中并未找到野生大鲵，且发现了捕猎事件的存在。我们建议梵净山国家级自然保护区加强对野生大鲵及其栖息地的保护，并通过在大鲵的整个分布区执行相关的野外调查和问卷调查工作，以评估其现有分布、种群丰度及非法盗猎的程度。

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