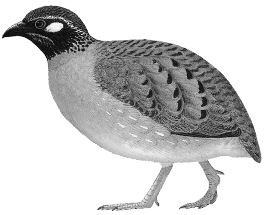
HAINAN PARTRIDGE
Arborophila ardens

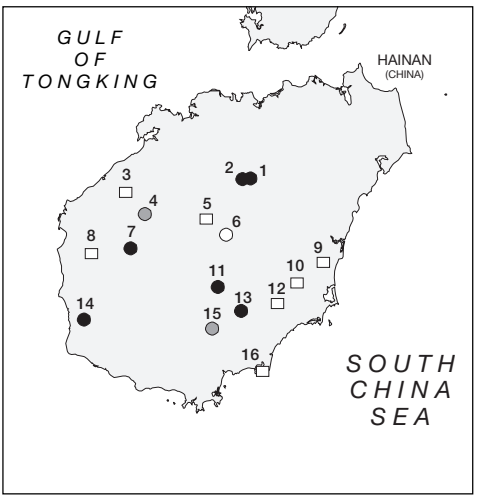


Critical □ —
Endangered □ —
Vulnerable ■ A1c,d; B1+2b,c,d,e; C1; C2a

This species is listed as Vulnerable because it has a small population, a small, severely fragmented range, and it is continuing to decline because of ongoing habitat loss. In addition, it is thought to have undergone a rapid population reduction.

DISTRIBUTION The Hainan Partridge is believed to be endemic to Hainan island, off the south coast of China, although there is an unconfirmed report from southern Guangxi (see Remarks 1). Records are as follows:

■ ***CHINA*** ■ ***Hainan*** **Nanwei Ling Nature Reserve**, Tunchang county, ten collected, 1987–1988, "good numbers" present, November 1994, population estimated at 24 or more individuals, 80–260 m, 1998 (Gao Yuren *in litt.* 1997, Gao Yuren and Yu Degun 1999); **Renxing**, Chengmai county, still present but seldom now seen (Gao Yuren *in litt.* 1997); **Bangxi Nature Reserve**, Baisha county, undated (Liu Donglai *et al.* 1996); **Qifang**, in or near to Baisha county, May 1960 (two in ASCN); **Fanjia Nature Reserve**, Danzhou city, undated (Liu Donglai *et al.* 1996), recorded in mountains near Danzhou city (possibly in Fanjia Nature Reserve), undated (Lu Taichun 1978); Qionghai city, small galliforms, possibly this species, seen in open areas on the nearby hills, March–April 1972 (He Fenqi *per* Gao Yuren *in litt.* 1997); **Limu Ling** (Luiwowan, Lei Mui Mon), Qiongzhong county, male (the type) collected, December 1891 (Styan 1893a,b, Morioka 1957; also Ogilvie-Grant 1900a), January 1903 (Morioka 1957, female in AMNH), and "apparently reliable local reports", 1987–1994 (Gao Yuren 1991, 1998); **Bawangling National Nature Reserve**, Changjiang and Baisha counties, four flushed by dogs at Yajia Forestry Station, December 1963 (Lu Taichun 1978), one or more collected, July 1964 (Xu Longhui *et al.* 1983), seen regularly, 1986–1993 (Gao Yuren *in litt.* 1997), "common", 1,000–1,100 m, April 1988 (King and Liao Weiping 1989), up to eight heard simultaneously, mainly at a hide where grain had been spread, and a pair seen near the



The distribution of Hainan Partridge *Arborophila ardens*: (1) Nanwei Ling Nature Reserve; (2) Renxing; (3) Bangxi Nature Reserve; (4) Qifang; (5) Fanjia Nature Reserve; (6) Limu Ling; (7) Bawangling National Nature Reserve; (8) Dongfang; (9) Liulianling Nature Reserve; (10) Jianling Nature Reserve; (11) Wuzhi Shan Nature Reserve; (12) Shangxi Nature Reserve; (13) Diaoluo Shan; (14) Jianfengling Nature Reserve; (15) Baoting; (16) Nanwan Nature Reserve.
○ Historical (pre-1950) ● Fairly recent (1950–1979)
● Recent (1980–present) □ Undated

waterfall at 500 m in disturbed forest, February 1989 (Hornskov 1989), three heard, 700–1,000 m, April 1998 (KFBG 1999); **Dongfang**, undated (Li Xiangtao 1996); **Liulianling Nature Reserve**, Wanning county, undated (Liu Donglai *et al.* 1996); **Jianling Nature Reserve**, Wanning county, undated (Liu Donglai *et al.* 1996); **Wuzhi Shan Nature Reserve**, Qiongzhong county, April 1903 (Morioka 1957, male in AMNH), one heard, 750 m, April 1988, in old secondary forest (King and Liao Weiping 1989), seen, January–March 1988 (S. Jensen *per* C. R. Robson *in litt.* 1993), and "apparently reliable local reports", 1987–1994 (Gao Yuren 1998; also Liu Donglai *et al.* 1996); **Shangxi Nature Reserve**, Wanning county, undated (Liu Donglai *et al.* 1996); **Diaoluo Shan** (which includes Baishuiling Nature Reserve, Lingshui county), five seen at Nanxi Forestry Station, February 1963 (Lu Taichun 1978), December 1962, January–March 1963 (four females in SCICN), "apparently reliable local reports", 1987–1994 (Gao Yuren 1991, 1998), and five, 600–800 m, May 1999 (KFBG in prep. b); **Jianfengling Nature Reserve**, Ledong county, up to eight heard, January–February 1989 (Hornskov 1989), "rare" there, but present at lower altitudes outside the reserve and sometimes seen in the markets nearby (Gao Yuren *in litt.* 1997), "apparently reliable local reports", 1987–1994 (Gao Yuren 1998), and one heard, 800 m, April 1998 (KFBG 1999); **Baoting**, male collected, October 1965, "rare", 1966 (Shaw Tsenhwang and Hsu Weishu 1966); **Nanwan Nature Reserve**, Lingshui county, undated (Liu Donglai *et al.* 1996); Cheteriang (untraced), January 1904 (Morioka 1957, male in AMNH); T'ou P'eng (untraced), male collected, October 1934 (Morioka 1957).

POPULATION The total population of Hainan Partridge has been estimated to be less than 10,000, probably much less (McGowan *et al.* 1995, Li Xiangtao 1996). A more precise estimate has been attempted on the basis of surveys in Bawangling Nature Reserve between 1988 and 1994 involving observations at fixed points (with baits to increase the number of sightings) and playback of taped calls: a total of 373 sightings were made during the survey period, and the population density in the core area of the reserve was estimated at 6.5 birds per km^2 (on the basis of 14 birds counted in 2.14 km^2) in October 1993 and 6–8 birds per km^2 (3–4 males, assumed to represent pairs, responded to playback of calls in one km^2) in March 1997 (Gao Yuren *in litt.* 1997, Gao Yuren 1998). The species is probably restricted to almost intact forest, which covers a total of only c.650 km^2, of which c.410 km^2 is in reserves and c.240 km^2 lies outside, so extrapolating the preliminary estimates of population density at Bawangling (6–8 birds per km^2) to the extent of remaining forest gives a tentative population estimate of 3,900–5,200 birds; however, its numbers must have declined substantially in the recent past because of the rapid rate of forest loss on Hainan (see Threats), and its population may still be declining, but not rapidly (Gao Yuren *in litt.* 1997, Gao Yuren 1998). For example, its numbers have decreased in Nanweiling Nature Reserve in recent years, where in 1998 the density was estimated at 2.59 birds per km^2 and the total population was put at 24 individuals, possibly more (Gao Yuren and Yu Degun 1999).

ECOLOGY ***Habitat*** This species appears to be restricted to primary evergreen forest, both broadleaf and mixed coniferous and broadleaf, and some mature secondary evergreen forests (Gao Yuren 1998). Past records were from between 500 and 1,200 m (del Hoyo *et al.* 1994, Stattersfield *et al.* 1998; see Distribution). However, Gao Yuren and Yu Degun (1999) found it in secondary forest at 80–260 m at Nanweiling Nature Reserve in 1998, indicating it may be able to survive in more degraded forest and at lower altitudes than was previously believed.

Food The Hainan Partridge searches for food among leaf-litter on the forest floor, and eats seeds and insects (Gao Yuren *in litt.* 1997).

Breeding The breeding season is from February to May, when this species has distinctive courtship calls (which are used to record them during bird surveys), and the clutch size is 2–3 (Gao Yuren *in litt.* 1997).

Table 1. Changes in the extent of natural habitats within this species's range on Hainan. The data in this table are reproduced from MacKinnon *et al.* (1996), and show the estimated areas (both original and remaining in km²) of presumably suitable habitats within this species's known range, and the area of each habitat estimated within existing protected areas. However, it is important to note that this only gives an indication of the extent of reduction of presumed habitats, as there is no information on the time-scale over which they have been lost, and this species does not necessarily occur throughout each habitat on the island.

Habitat	Original	Remaining	%	Protected	%
subtropical evergreen broadleaf forest	7,480	832	11	108	1.4
lowland wet evergreen forest	7,192	754	10	72	1.0
tropical semi-evergreen forest	9,288	1,612	17	336	3.6

THREATS The Hainan Partridge is one of two threatened bird species that are entirely restricted to the "Hainan Endemic Bird Area", threats and conservation measures in which are profiled by Stattersfield *et al*. (1998).

Habitat loss Forest loss and fragmentation is the major threat to this species, which has already severely reduced and fragmented its former range (Gao Yuren 1998). The area of natural tropical forest on Hainan is estimated to have decreased from 16,920 km² in 1943 to 3,000 km² in 1994, mainly as a result of excessive timber extraction, the replacement of forest by rubber plantations, slash-and-burn agriculture and the unrestricted cutting of wood for fuel and other uses (Zhou Guangyi 1994). In another analysis, forest cover was estimated to have declined from 8,630 km² (25.7% of the island) in 1949 to about 2,420 km² (7.2%) in 1991 (Collins *et al*. 1991; see also Smil 1984, Table 1). Much of the remaining forest is probably disturbed and not of full stature, so is not capable of supporting many of the specialised forest birds (W. Bleisch *in litt.* 1993). The rate of forest loss has been much reduced on Hainan in recent years following the implementation of a logging ban there, but in 1999 illegal logging was seen at Diaoluo Shan and in Jiaxi Nature Reserve (where this species has not yet been recorded, but presumably could occur), and slash-and-burn agriculture noted near Wuzhi Shan (J. Fellowes *in litt.* 1999). Moreover, in Nanweiling Nature Reserve an area of 2.67 km² of forest was illegally cleared in 1997 for replacement with a plantation, although this was discovered and stopped, and the forest there is also affected by cattle herding and rattan collection (Gao Yuren and Yu Degun 1999).

Hunting Illegal hunting for food using both traps and guns is also a major threat to the Hainan Partridge (McGowan *et al.* 1995, Gao Yuren 1998, Zheng Guangmei and Wang Qishan 1998; also King and Liao Weiping 1989). For example, hunting pressure is high in Wuzhi Shan (Gao Yuren *in litt.* 1997) and Nanweiling Nature Reserves (Gao Yuren and Yu Degun 1999). At Renxing villagers used to catch birds and sell them in markets, but numbers are now too low to be worth the trouble (Gao Yuren *in litt*. 1997).

MEASURES TAKEN ***Legislation*** The Hainan Partridge is a Nationally Protected Species (First Class) in China, and its hunting is therefore illegal (Gao Yuren 1998, Zheng Guangmei and Wang Qishan 1998).

Protected areas The Hainan Partridge has been recorded in the following protected areas: Fanjia Nature Reserve (31 km², forests in poor condition near the reservoir but there is apparently much better forest to the south in Limu Shan), Nanweiling Nature Reserve (no information), Bawangling National Nature Reserve (56 km², forests apparently in good condition), Bangxi Nature Reserve (3 km², forests apparently damaged), Wuzhi Shan Nature Reserve (134 km², forests on upper slopes apparently in good condition but lower slopes seriously degraded), Jianfengling Nature Reserve (77 km², forests apparently rather disturbed and too small), Liulianling Nature Reserve (27 km², apparently no forests in the reserve), Jianling Nature Reserve (109 km², forests apparently in fine condition), Shangxi Nature Reserve (117 km², condition of forests not clear), Baishuiling Nature Reserve (30 km², forests

probably in good condition), Nanwan Nature Reserve (10 km^2, apparently no forests left in the reserve) (sizes and condition from MacKinnon *et al.* 1996).

Bawangling Nature Reserve appears to be an important stronghold for the Hainan Partridge, as it still holds primary forests and is less disturbed than most of the island because of its inaccessibility; it also supports the only surviving group of the endemic Hainan subspecies of black gibbon *Hylobates concolor hainanus* (Gao Yuren 1998). The Hainan government is currently considering extensions of existing reserves at Bawangling and elsewhere (J. Fellowes *in litt.* 1999). There is a small Hainan Partridge population in Nanweiling, where all logging was prohibited when a county-level nature reserve was established in the mid-1980s, but financial difficulties in the past five years have delayed the funds required for forest protection and an area of forest was illegally cleared in 1997 (Gao Yuren and Yu Degun 1999). It is possible that the species occurs in a few more of the 78 protected areas on Hainan (see Gao Yuren 1998), but most of them do not appear to contain suitable habitat for it, many of them are small and isolated (W. Bleisch *in litt.* 1993), and the populations—if any—involved may prove too small to be viable (Gao Yuren 1998).

Habitat protection The Hainan government has enforced a ban on the logging of primary forest since January 1994, which should have lessened the pressure on its habitats, although secondary forest may still be cut (Gao Yuren 1998).

Captive breeding The South China Institute of Endangered Animals started a successful Hainan Partridge captive-breeding programme in 1991 (Gao Yuren *in litt.* 1997, Zheng Guangmei and Wang Qishan 1998). However, it is by no means clear that this initiative is needed; it might help supply birds for re-introduction to depleted areas such as Renxing (see Threats), but this could equally well be done by translocations from well-populated areas, and in any case requires additional work to ensure the original causes of depletion will not immediately recur, etc. (for further information see IUCN/SSC 1998). Meanwhile, habitat conservation must remain the first priority.

MEASURES PROPOSED ***Protected areas*** Although the Hainan Partridge occurs in many protected areas, its status in most of them is poorly understood and a review of areas of suitable habitat is required throughout its range, to determine which are the key sites for its conservation, whether there is a need to upgrade the status of any reserves or to extend their boundaries to include additional areas of forest, whether measures are necessary at some sites to rehabilitate and restore suitable habitat, and whether some new protected areas need to be established.

MacKinnon *et al.* (1996) made the following recommendations for the protected areas where this species has been recorded: at Fanjia Nature Reserve, manage the existing reserve area as protection forest but create a nature reserve at Limu Shan; at Bawangling National Nature Reserve, extend the reserve to c.120 km^2, to include all remaining natural forests in this area and to meet other reserves in the area, and manage as a single conservation unit; at Bangxi Nature Reserve, re-evaluate the reserve; at Wuzhi Shan Nature Reserve, reconstruct forest corridors to link it with Qizhiling Nature Reserve in the south; at Jianfengling Nature Reserve, enlarge the reserve to link up with the rest of the South-west Hainan conservation unit; at Liulianling Nature Reserve, re-evaluate the reserve and perhaps manage as a scenic area; at Jianling Nature Reserve, improve protection; at Shangxi Nature Reserve, re-evaluate and ensure that the reserve boundary matches that of good forest; at Baishuiling Nature Reserve, link with Diaoluo Shan if possible; at Nanwan Nature Reserve, manage as a recreation area. The Hainan provincial government should upgrade the 11.03 km^2 (with 9.33 km^2 of surviving forest) Nanweiling Nature Reserve from a county level to a provincial level reserve with tight restrictions on habitat destruction and hunting (Gao Yuren and Yu Degun 1999). Improved management and law enforcement are also needed in existing protected areas, through staff training and improved financial support (M. W. N. Lau *per* J. Fellowes *in litt.* 1999).

Research As described above, more surveys are required to determine the distribution and habitat utilisation of this species throughout the island (McGowan *et al.* 1995), with the aim of identifying the most important areas and determining whether any of them should be established as new reserves or whether some of the smaller forest patches might be joined together to create new conservation units (Gao Yuren 1998).

Education The information gathered on Hainan Partridge and other species can provide the basis for public awareness programmes on the plight of the threatened and endemic forest wildlife of Hainan (Gao Yuren 1998). Efforts should be made to reduce hunting of this and other forest species through public education and measures to control the use of shotguns (Gao Yuren *in litt.* 1997).

REMARKS (1) An undated record from Jingxi county, Guangxi (Lu Taichun 1991, Lu Taichun *et al.* 1994), is regarded as probably erroneous (Li Xiangtao 1996).