

Threatened Birds of Asia:

The BirdLife International Red Data Book

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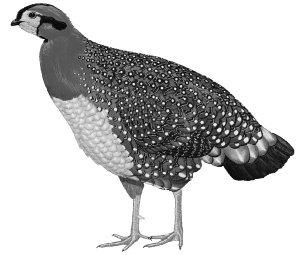
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BLYTH'S TRAGOPAN

Tragopan blythii

Critical —
Endangered —
Vulnerable C1; C2a



This species qualifies as Vulnerable because its total population is believed to be small and declining, and is scattered in small subpopulations within a severely fragmented range. Widespread high levels of hunting and continuing habitat destruction will inevitably exacerbate this situation.

DISTRIBUTION Blyth's Tragopan historically ranged from the mountains of north-east India and Bhutan to extreme south-eastern Tibet and north-west Myanmar (McGowan and Garson 1995). Two subspecies are recognised, *blythii* in lands south of the Brahmaputra, and *molesworthi* from lands north of the Brahmaputra (Ali and Ripley 1968–1998). However, as known *molesworthi* is apparently known from only three specimens its distribution throughout Arunachal Pradesh is not confirmed (Johnsgard 1999). The distribution of the species is strikingly patchy, especially in Arunachal Pradesh, although this possibly relates to survey coverage rather than actual range (Ghose and Sumner 1997).

■ **CHINA** This species was listed for Zayu, Cona and Medog counties in south-east Tibet, and Gongshan county in north-west Yunnan by Li Xiangtao (1996). However, its occurrence in Tibet appears to be mainly based on records from within the boundaries of India (as mapped in TAW 1999, but see Remarks 1). Apart from a provisional record at Nying Sang La, 3,650 m, where *T. b. molesworthi* was possibly seen at the summit, 1934 (Ludlow ms), records are from:

■ **Tibet Dawang** (Moindawang, Dangan La), “Tibet” (see Remarks 1 and 2), male collected (type of *T. b. molesworthi*), 2,440 m, March 1914 (Baker 1914c; also Cheng Tso-hsin 1987);

■ **Yunnan Gongshan county**, at Bapo Maku, 1,980 m, November 1973 (Peng Yanzhang *et al.* 1979, male in KIZCN), at Silaluo, Dulongjiang, 2,600 m, September 1990 (two females in KIZCN).

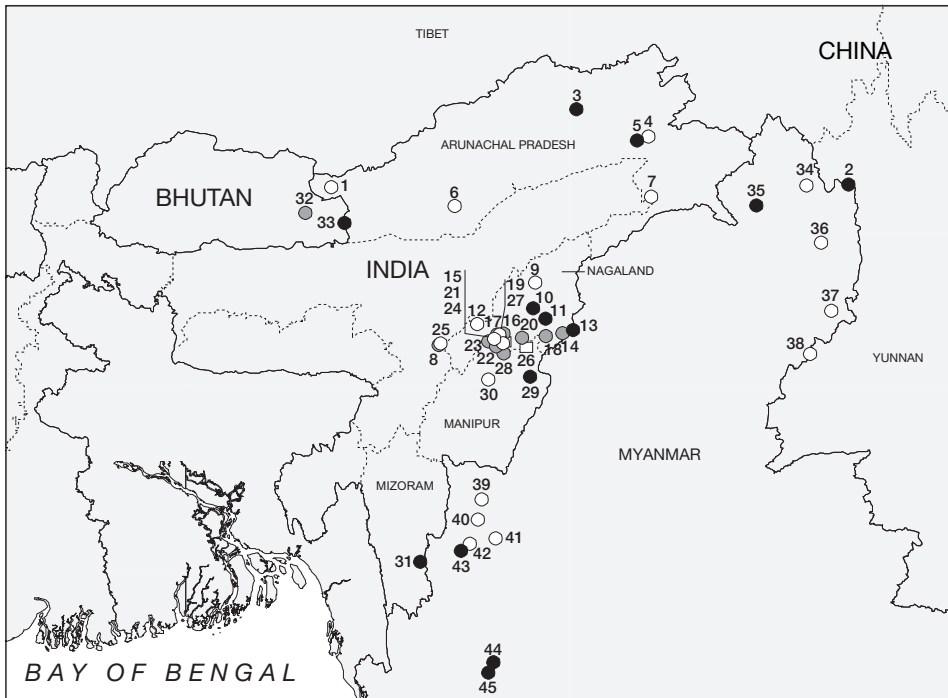
■ **INDIA** All records are from the north-eastern states of Arunachal Pradesh, Assam, Nagaland, Mizoram and Manipur (Zeliang 1980, McGowan and Garson 1995, Kaul *et al.* 1995a). Records from the Sikkim region suggest that *molesworthi* may still be present (R. Kaul *in litt.* 1997) and there is a gap of around 750 km between this putative record and the nearest site in Arunachal Pradesh, suggesting that intervening populations may await discovery (Ghose and Sumner 1997). Records are from:

■ **Arunachal Pradesh** Dibang Valley Sanctuary (McGowan and Garson 1995), although no primary record has been traced and it was not listed for the site by McGowan *et al.* (1999), hence here treated as provisional; **Shimong**, skins of males seen, March 1998, and apparently common along Shimong–Singha track, Upper Siang district (Singh 1999); **Mishmi hills**, two, undated (Beebe 1910), this site presumably being the “Sadiya hills” mentioned by Jerdon (1870a) for the species, undated; **Mehao Wildlife Sanctuary**, Mayodia, partial remains of a female seen (see Remarks 3), December 1992 (Choudhury 1996i), partial remains of males found, January–February 1994 (Kaul *et al.* 1995a), Roing–Mayodia, 1,900 m, one female apparently this species (see Remarks 3), December 1997 (Singh 1999); **Dafla hills**, one individual, 1883 (Cran 1887); **Patkai hills**, undated (Baker 1921–1930), although this range extends outside this state; recently reported (unconfirmed) at Eagle Nest Wildlife Sanctuary (R. Kaul verbally 1999) and a preserved skin of a male examined by Choudhury (2000b) in

the adjacent Sessa Orchid Sanctuary, 2000, was reportedly killed above 1,500 m in the vicinity two years previously;

■ **Assam Barail range**, pre-1904 (male in BMNH), this presumably also being the site in North Cachar for two birds in April, pre-1899, nine more collected, March, c.1898 (Baker 1894–1901), and eggs taken in April 1899 (BMNH egg data), with sightings apparently around Mahadeo, Hengmai and Hungrum (Beebe 1918–1922, Johnsgard 1999);

■ **Nagaland** unspecified localities in the Naga hills, including February 1899 (male and two females in AMNH), 2,050 m, February 1940 (male in FMNH), two males, undated (Beebe 1910); **Mokokchung**, undated (Baker 1921–1930); **Zunheboto district**, near Vishepu, Dzulhami and Kilomi villages, June 1996 (Choudhury 1997c); **Satoi**, apparently common, June 1996 (Choudhury 1997c); near **Samaguting**, December 1878 (juvenile male in BMNH); **Saramati**, “common on the slopes”, June 1996 (Choudhury 1997c); **Fakim Wildlife Sanctuary**, Phek district, 1970s (Zeliang 1980), undated (Choudhury 1997c); near **Jotsama** (Jotsomah), under the Barail range, one male, undated (Godwin-Austen 1874b); **Kohima**, Naga hills, 2,550 m, pre-1889 and January 1952 (male and female in BMNH), November 1922 (specimen in BNHS, Abdulali 1968–1996), January 1951 (seven specimens in UMMZ); **Khonoma** (Khonomah), Barail range, pre-1895 (specimen in BMNH), February 1940 (five specimens in FMNH,



The distribution of Blyth's *Tragopan blythii*: (1) Dawang; (2) Gongshan county; (3) Shimong; (4) Mishmi hills; (5) Mehao Wildlife Sanctuary; (6) Dafla hills; (7) Patkai hills; (8) Barail range; (9) Mokokchung; (10) Zunheboto district; (11) Satoi; (12) Samaguting; (13) Saramati; (14) Fakim Wildlife Sanctuary; (15) Jotsama; (16) Kohima; (17) Khonoma; (18) Phekekedzumi range; (19) Pulebadze Wildlife Sanctuary; (20) Kopamedzu range; (21) Khunho; (22) Japvo; (23) Dzukou range; (24) Viswema; (25) Pauna; (26) Pftusero; (27) Dzuko valley; (28) Maram; (29) Sirohi; (30) Kanpru; (31) Blue Mountain National Park; (32) Yonpu La; (33) Shingkhar Lawri; (34) Taron-Tamai junction; (35) Putao; (36) Ahke; (37) Htawgaw; (38) Kambaiti; (39) North Chin hills; (40) Fort White; (41) Haka; (42) Falam; (43) Ramkhlau; (44) Mindat; (45) Mount Victoria.

○ Historical (pre-1950) ● Fairly recent (1950–1979) ● Recent (1980–present) □ Undated

UMMZ), November 1950 (Ripley 1952b); **Phekedzumi range**, 1970s (Zeliang 1980); **Pulebadze Wildlife Sanctuary**, Kohima district, undated (Zeliang 1980, Choudhury 1997c); **Kopamedzu range**, 1970s (Zeliang 1980); “on the ascent to” **Khunho**, heard, 1872/1873 (Godwin-Austen 1874b); **Japvo**, Kohima district, “not uncommon” around 2,550 m, November 1950 (Ripley 1952b); **Dzukou range**, 1970s (Zeliang 1980); near the village of **Viswema** (Viswémah), one male trapped, 1872–1873 (Godwin-Austen 1874b); **Pauna** (Pouna), Barail range, undated (Godwin-Austen 1874b), “commonly found”, 1970 (Zeliang 1980); **Pfutsero** (Phutsero), Phek district, undated (Choudhury 1997c); **Henema** (untraced), undated (Jerdon 1870b); **Sima-Gooding** (untraced), Naga hills, 2,400 m, c.1872 (Godwin-Austen 1872a);

■ **Manipur** unspecified locality, pre-1889 (male in BMNH), two, 1894, one, 1896, one, February 1928 (Higgins 1933–1934); **Dzuko valley**, undated (Choudhury 1992a); **Maram**, December 1950 (female in UMMZ); **Sirohi** (Shiroi; Siroi), Ukhrul district, presumably including “Shirohifurar peak”, where specimens were collected, winter 1873 (Godwin-Austen 1882), present, 1980s (Choudhury 1992a), reliably reported by local hunters around Ukhrul, January 1991 (*Oriental Bird Club Bull.* 13 [1991]: 47–52), and apparently commonly trapped in the area (Choudhury 1996i); **Kanpru** (Kaupru), 40 km north-north-west of Manipur (i.e. Imphal), 2,900 m, March 1899 (three males in BMNH, Turner 1899); north-east Manipur, undated (Hume 1888);

■ **Mizoram Blue Mountain National Park** (Phwangpui National Park), Lushai hills, April 1953 (12 specimens in FMNH, UMMZ; also Storer 1988), one female, others heard, May 1996 (Kaul *et al.* 1996, Katju 1996), 1997 (Ghose and Thanga 1998, D. Ghose *in litt.* 1999).

Unspecified records include: **Noklak**, a mounted specimen, apparently of local origin, found in 1996 (Choudhury 1997c); **Maenam Wildlife Sanctuary**, Sikkim, reported (Ghose and Sumner 1997), but subsequent surveys only located Satyr Tragopan *Tragopan satyra* (*Oriental Bird Club Bull.* 30 [1999]: 12).

■ **BHUTAN** The species appears to be restricted to the easternmost portion of the country. Confirmed records are from: **Yonpu La** (Yongphula), Tashigang district, 2,600 m, one female, March 1966 and a party of 4–5, December 1973 (Ali *et al.* 1996); **Shingkar Lawri** (Sinkhar Louri), 2–3 days’ walk north of Daifam, Samdrup Jhonkhar district, 2,600 m, one male collected, April 1938 (although label states “April 1936”) (Ludlow and Kinnear 1944), also (apparently in the same region) one male and two females on Thimsing La (Serthi Gewog) on the Bhutan/India border between border pillars 291 and 295, February 1997 (R. Pradhan *in litt.* 1998). In addition, locals reported a tragopan other than *T. satyra*, and thus possibly this species, around Sakden and Mera, which is unsurprising as the latter locality is only c.24 km from Shingkar (Ludlow and Kinnear 1944).

■ **MYANMAR** The species’s range in Myanmar once extended from the Chin hills eastward through the Kachin hills into Yunnan (Peacock 1933), but there are few recent reports from the country. Unspecified reports include a male (undated) at 2,400 m in the Haka hills (Chin/Lushai hills), northern Arakan (Beebe 1910) and in the Chin hills (male and female in AMNH, Peacock 1933), and two birds captured by hunters in March 1996 at an unknown location (Khin Ma Ma Thwin *in litt.* 1998). Records are from: near the **Taron-Tamai junction** (specifically at 28°38’N 98°00’E), in the Nam Tamai valley, 1,800 m, November 1938 (male in BMNH, Ticehurst 1939); near **Putao** (site given as 12 km east of Indian border, 133 km south of Tibet), 2,500 m, 1998 (King 1998b); **Ahke**, 1,500 m, April 1939 (male in BMNH); **Htagaw**, April 1927 (Abdulali 1968–1996); **Kambaiti**, 1934 (male in NRM); in the **North Chin hills**, one female, May 1913 (Hopwood and Mackenzie 1917); **Fort White**, undated (Venning 1912); Zimuh Ktlang precipice, c.40 km north-west of **Haka**, Chin hills, 2,200–2,400 m, March 1930 (two males in BMNH); **Falam**, Chin hills, pre-1898 (female in BMNH); **Ramkhlaw** (Ramhtlow), Chin hills, c.2,135 m, April 1995 (Robson *et al.* 1995, King *et al.* 1996); near **Mindat**, 2,500 m, feather of male found, April 1995 (Robson *et al.* 1995, King *et*

al. 1996); **Mount Victoria**, at Pakoku, mostly “west of Kanpetlet”, 2,400–3,000 m, undated (Harington 1909a), March, April 1904 (male and female in BMNH), apparently in 1937 (Stresemann and Heinrich 1938), April–May 1938 (11 specimens in FMNH and MCZ), and at 2,300 m, a male presumed to be this species, March 1995 (Robson *et al.* 1995, King *et al.* 1996); “K Peak” (untraced), Chin hills, undated (Abdulali 1968–1996).

POPULATION China The population is likely to be very small and declining because of habitat loss (Zhang Zhengwang *in litt.* 1997). The nominate race is known from a single site in Yunnan and three old specimen records supposedly within Tibet, although there are “no recent definite records” from this area and suitable habitat is presumably “rare” (Johnsgard 1999) suggesting that the population is indeed small.

India Local people in the Dafla hills reported the species to be “very common on the lower ranges” in the late nineteenth century (Cran 1887). An apparently healthy population is reported in Mehao Wildlife Sanctuary, Arunachal Pradesh (R. Kaul verbally 1999). Fairly large numbers also appear likely to persist in Manipur where locals report that, of 200 galliforms snared on the Sirohi ridge every year, around one-third are tragopans (Choudhury 1996i). In Nagaland the species was “not uncommon” on the slopes of Mt Japvo in 1950 but in general “very local” (Ripley 1952b), and only two individuals were snared in several months in the Naga hills in 1962 (P. Wayre in Vincent 1966–1971); more recently, however, it was apparently “common” on the slopes of Mt Saramati, “still found, but not in large numbers” in much of the border ranges in Zunheboto and Phek districts, and “abundant” in the nearby Satoi area (Choudhury 1997c), and Zeliang (1980) estimated c.100 on Pauna, c.30 on Dzukou, c.40 at Pulebadze Sanctuary, c.30 at Kopamedzu, c.30 at Phekedzedzumi and c.70 at Fakim in 1979, giving a total of 400 known individuals in Nagaland. His estimation for Pulebadze suggests that population density at the site was 4.3 birds per km² (Johnsgard 1999).

In Arunachal Pradesh, Singh (1999) encountered skins of the species at Shimong in Upper Siang district, where locals informed him that it was “common” between there and Singha. Call counts in Blue Mountain National Park, Mizoram, from March to May 1997 produced an estimate of 14 pairs within the 50 km² of the park (D. Ghose *in litt.* 1999; see also Ghose 1997). The estimated 400 individuals in Nagaland (see above) suggested a total world population of “at most, a few thousand” (Gaston 1980) and that the subspecies *blythii* may number between 500 and 5,000 individuals and be declining because of its restricted range and fragmented habitat in India (McGowan and Garson 1995). However, the relatively large quantity of remote montane forest that remains difficult to survey implies that this figure may be an underestimate; on the other hand, the narrower altitudinal range of Blyth’s Tragopan (Ghose and Sumner 1997, R. Kaul verbally 1999) means that the available habitat must be fairly limited, and the species has apparently become very rare in some localities.

Bhutan The species seems to be restricted to the east of the country, a region still largely unexplored by ornithologists. For this reason, it is impossible to make any assessment of its local range or abundance (C. Inskipp *in litt.* 1999) although it conceivably survives in “considerable numbers” (Johnsgard 1999).

Myanmar It was apparently “often seen” at Fort White early in the twentieth century (Venning 1912) and Baker (1921–1930) described it as “comparatively common in certain suitable places” in the Chin hills. It is impossible to estimate the current Myanmar population, but Robson *et al.* (1995) described it as scarce to uncommon in the Chin hills. In the extreme north, U Tun Yin (in Vincent 1966–1971) described the species as common in five locations in 1970. The park warden at the Natma Taung National Park suggested it was neither overly rare nor abundant in the locality, leaving the question of its actual status rather open (Khin Ma Ma Thwin *in litt.* 1998). It is thought to survive in quite high numbers in Myanmar as hunters in several regions know the bird well, its range is extensive there and enormous tracts of habitat remain (B. F. King verbally 1998, King 1998b). However, on Mt Victoria it is now

very rare and intensively trapped, although it used to be common according to an old hunter; tape recordings elicited no response on the mountain in 1995 (King *et al.* 1996). “Despite the paucity of formal records, the Blyth’s Tragopan appears to be widespread, albeit rare, in suitable habitat throughout the higher elevations of the Chin Hills” (King *et al.* 1996).

Captivity The captive population (comprised entirely of *blythii*) stood at 32 individuals in eight collections in November 1989, but all these were descended from one of two pairs imported to the UK in 1983 (Howman 1984, Assink and Coles 1989). There are probably around 50 individuals held captive worldwide (G. Robbins in McGowan and Garson 1995).

ECOLOGY Habitat The favoured haunts of this species lie in mature subtropical forests, temperate evergreen forests and densely wooded valleys of the north-eastern Himalaya and outlying ranges (Baker 1922–1930, Wickham 1929–1930, Smythies 1986). In this habitat it seems to prefer areas with dense undergrowth, often of bamboo (Ripley 1982, Robson *et al.* 1995, R. Pradhan *in litt.* 1998). Robson *et al.* (1995) found oak forest with a relatively dense undergrowth of bamboo to be its preferred habitat in Myanmar, while Bhutan records are from rhododendron forest with ringal bamboo and a dense understory of ferns (Biswas 1968, McGowan and Garson 1995) or warm broadleaved forest with bamboo (R. Pradhan *in litt.* 1998). A more recent sighting of three birds in the country was made under thick clumps of the bamboo *Chimonobambusa cellosa* (R. Pradhan *in litt.* 1998). It is often strongly linked with primary forest (Ali and Ripley 1968–1998, Grimmett *et al.* 1998). However, in Blue Mountain National Park, Mizoram, it appears to avoid primary forest with bamboo, occurring in areas with moderate undergrowth and canopy cover, especially on steep slopes (Ghose 1997, Ghose and Sumner 1997). It has been recorded on the top of a precipice and at the base of rocks in ravines (BMNH label data) and on “relatively inaccessible cliffs with short trees” (Ghose and Sumner 1997). Indeed, most recent records derive from very steep terrain (Robson *et al.* 1995, Ghose and Sumner 1997, Ghose and Thanga 1998, Singh 1999) although this is perhaps a result of higher hunting pressure elsewhere rather than any specific habitat preference (Ghose 1997). Blyth’s is generally found at lower altitudes than its congeners. In Bhutan records fall between 1,800 and 3,000 m (Grimmett *et al.* 1998) while in India it apparently occurs from 1,800 m in winter to 3,300 m in summer (Baker 1922–1930), and is “rarely met with below 1,750 m” (Baker 1894–1901). Later Baker (1921–1930) gave the altitudinal range as 1,500–2,750 m, and it probably occurs below the lower estimate. Recent records in India all derive from below 2,000 m (Ghose and Sumner 1997), suggesting that the elevational band occupied by the species is narrow. In the Chin hills of Myanmar it is recorded on the higher peaks between 2,000 m and 2,400 m (Wickham 1929–1930, Smythies 1986, BMNH label data), although in another account from between 1,500 and 2,700 m (Peacock 1933). On Mount Victoria it was apparently partial to the region of the summit at around 3,000 m (Stresemann and Heinrich 1940).

Food Its diet includes a variety of seeds, berries, fruits, buds and invertebrates, while even frogs have been eaten in captivity (Godwin-Austen 1879, Baker 1921–1930, 1932–1935, del Hoyo *et al.* 1994). Captive birds are principally vegetarian, however, with an emphasis on fruits and buds (Howman 1979). Crops of several specimens have been “full of green leaves” (Stresemann and Heinrich 1940, BMNH label data). The stomach of a female collected in Bhutan contained only vegetable matter, mostly leaves and fronds of ferns, including leaves of Spireae, leaves of *Herpetospermum caudigerum* (Cucurbitaceae), the leaves of a species of Ranunculaceae, as well as bits of tender shoots, petioles and leaf buds (Biswas 1968, Ali *et al.* 1996). In India the species has been recorded feeding on small worms and “soft-bodied arthropods (probably larvae of some insects)” (Ghose 1997, Ghose and Thanga 1998) as well as the seeds of palms and wild figs (Ghose and Sumner 1997). Ripley (1952b) was shown “many stripped fronds of a rather coarse branching bracken-like species growing in the understory” by Naga tribespeople on Mt Japvo, and informed that these signs were

made by Blyth's Tragopan. The assertion that Blyth's Tragopans make daily foraging trips along well-worn trails (del Hoyo *et al.* 1994) is an inference presumably drawn from Beebe's (1918–1922) statement that Nagas lay snares along tragopan routes, and that the species feeds daily in a “more or less limited area”.

Breeding The species breeds from early April through May, thus being an earlier breeder than its congeners (Baker 1921–1930). Enlarged ovaries are recorded on specimens collected in April and May (BMNH and MCZ label data). A female collected on 30 March 1966 in Bhutan was considered “about to lay”, as it had well-developed ovaries and incubation patches (Ali *et al.* 1996). A female collected in Assam was “laying” on 2 April 1940 (FMNH label data). In Mizoram, India, a female was located brooding in April (Ghose and Thanga 1998). The breeding season in Nagaland is March (Zeliang 1980). A hen with two downy chicks was found on 29 May, Mt Victoria (Stresemann and Heinrich 1940). The species nests either on the ground or in trees (del Hoyo *et al.* 1994, Ghose 1997). Naga people report that its bulky nest of sticks (usually an abandoned nest of another species) is lined with twigs and grass and placed in trees, stumps or bushes, usually 2–3 m above ground level, but sometimes up to 6 m (Baker 1921–1930, Smythies 1986). In April 1996, a nest in Phawngpui National Park, Mizoram, was placed on the ground on a cliff face (Ghose and Sumner 1997). At the same site in 1997, an active nest was found about 6 m up a *Myristica* tree on a steep slope, and old nests were found at the base of a rock and the base of a rhododendron bush, all on cliff slopes (Ghose 1997). The tree nest was a basket-like structure made of dried orchid stems and roots of the same tree (Ghose 1997, Ghose and Thanga 1998). The clutch is reported to be between two and six eggs (Baker 1921–1930, Smythies 1986, Ghose and Thanga 1998). Godwin-Austen (1879) argued that two or three eggs were the maximum number as the adult female is constrained by how many fledglings she can protect under her wings (i.e. only two), but this is not the case. Eggs laid by captive birds are apparently incubated for 36–45 days before hatching (Zeliang 1980). However, these data imply a longer incubation period than any other pheasant, and they are “therefore probably in error” (Johnsgard 1999); the 28–30 days given by Howman (1984, 1993) is probably more accurate. At the 1997 nest in Phawngpui National Park, the female incubated for 15 days, only being observed to leave the nest on two mornings—one two-hour break on day six and one four-hour break on day eight—while the male was observed once during this time providing food at the nest; two of the eggs were eventually predated by a Black Eagle *Ictinaetus malayensis* and the female deserted (Ghose and Thanga 1998). During the few occasions when incubating females vacate nests to feed in captivity, males generally take over incubation (Howman 1984).

Migration The species is considered to be resident but “subject to vertical movements” (Ripley 1982), although Baker (1921–1930) stated that it did not seem to move according to weather conditions. As weather extremes are not marked in the range it occupies, these seasonal movements are thought to be minor (del Hoyo *et al.* 1994).

THREATS Blyth's Tragopan is one of nine threatened members of the suite of 19 bird species that are entirely restricted to the “Eastern Himalayas Endemic Bird Area”, threats and conservation measures in which are profiled by Stattersfield *et al.* (1998). Continuing habitat loss through deforestation and conversion of land for agriculture is threatening the species throughout its range, as is the widespread hunting of pheasants, with local people in many areas setting snares along its well-worn foraging paths (McGowan and Garson 1995, del Hoyo *et al.* 1994). For cultural reasons, the subspecies *molesworthi* should be under less intense hunting pressure in Bhutan and Tibet than elsewhere (McGowan and Garson 1995).

China Deforestation is probably the main threat to this species in China (Zhang Zhengwang *in litt.* 1997).

India A report that the species is celebrated by locals and “not much persecuted” in Nagaland (Choudhury 1997b,c), is probably incorrect given the number of contradictory

reports from north-east India. Trapping is undertaken on a large scale in many areas and the species is apparently fairly easy to snare (Baker 1921–1930). Indeed, Sumati (1976) remarked that it was “on the verge of extinction because of mass snaring”. Hunting is an increasing problem in Arunachal Pradesh, where galliforms are now very rare within 5–10 km of villages and local people very frequently carry guns (R. Kaul verbally 1999). During a casual search in c.0.5 km² of forest near a camp in Mehao Wildlife Sanctuary over 100 snares set by road workers were found (Singh 1999). In Nagaland and Arunachal Pradesh, India, the species is hunted intensively for food according to Zeliang (undated). Beebe (1918–1922) reported that the Nagas catch it by setting a long line of snares and driving the birds towards it, and evidently little has changed: the current predilection of Naga people for hunting wild game is perhaps the major threat to the species’s survival (Choudhury 1997b,c). However, although the species occasionally appears in the wildlife market at Kohima (Choudhury 1997b,c), it is generally “not much persecuted” because it is celebrated as the emblem of the state (A. Choudhury *in litt.* 2001). The local Nagas, Kukis and Mizo tribespeople in the Manipur hills hunt and poach wildlife intensively (Choudhury 1992a) even within protected areas such as Blue Mountain National Park (Mishra *et al.* 1998), and this increases the difficulty of effective conservation. Hunting is also practised within protected areas in Mizoram by fringe populations (Katju 1996, Kaul *et al.* 1996), although it has also been reported that hunting of this species has become rare in Mizoram in recent years (D. Ghose *in litt.* 1999). Locals reported that 60–70 individuals were snared on the Sirohi ridge every year in Manipur (Choudhury 1996i).

Forest-cover is decreasing at an alarming rate in north-east India with at least 1,000 km² cleared annually (Choudhury 1996h). Widespread damage to the subtropical forest habitat of the species in the region is caused by semi-shifting cultivation or “jhum” (Choudhury 1992a, R. Kaul verbally 1999). Although such practices encourage bamboo growth, they have more or less restricted evergreen forests in the region to steep inaccessible areas where cultivation is difficult, reducing the available habitat for the species considerably (Choudhury 1992a). Because of the lower altitudinal preferences of *blythii*, its habitat is probably much more susceptible to damage or clearance than *satyra* (R. Kaul verbally 1999). In Arunachal Pradesh, forests are threatened by shifting cultivation, timber harvesting and increased clearance for tea cultivation (Singh 1999), although tea is not a major crop in the range of Blyth’s Tragopan (P. J. K. McGowan *in litt.* 1999). Shifting cultivation in Nagaland has caused a “great destruction of forests” resulting in a distribution of this species that is “fragmented into isolated colonies” (Ripley 1952b). The bulk of Nagaland’s 14,300 km² of forest has been degraded owing to slash-and-burn agriculture and logging, around 13,200 km² of it is controlled by villages, and only 222 km² is covered by protected areas (Choudhury 1997b,c). Shifting cultivation is a major problem facing protected areas in Mizoram, where it is still extensively practised within park boundaries along with excessive fuelwood collection (Katju 1996, Kaul *et al.* 1996). These protected areas are currently isolated fragments of natural habitat in a “sea” of secondary growth comprising scrub, bamboo, grass and banana plantations, a circumstance that limits the potential migration of terrestrial species between patches (Katju 1996). Blue Mountain National Park, Mizoram, is a small island of natural habitat flanked on all sides by villages, a circumstance which greatly increases disturbance and exploitation of the habitat it serves to protect (Kaul *et al.* 1996, Ghose and Sumner 1997). In particular, its fringes are threatened by locals intent on clearing forest for agriculture and hunters (Ghose and Sumner 1997). Efforts are currently being made to control these problems, but the lack of local infrastructure is a major obstacle (Ghose and Sumner 1997).

The risk from trade is difficult to assess, with contradictory published statements. Choudhury (1997b,c) reported no organised trade in this species although one or two specimens occasionally appeared in local bird markets, adding that it is sometimes caught and reared as a domestic pet; but Sumati (1976) stated that there is a high demand for the

species from zoos offering Rs. 10,000 for pairs, an incentive that presumably, at least temporarily, raised snaring pressure in some areas. As galliforms are restricted to unpopulated zones, their distribution is constantly declining with the spread of the human population (S. Kumar *in litt.* 1999). The species appears to be sensitive to disturbance, at least in captivity, when no eggs are apparently laid when disturbance occurs (Zeliang 1980).

Bhutan Sherpa (1994) suggested that shifting agriculture is likely to become a problem for Bhutan's forests and that overgrazing and burning will also cause significant damage, despite the country's admirable forestry policy.

Myanmar Little used to be known about hunting practices in the country, but it was thought that levels of persecution and poaching were high (U Tun Yin 1954). Certainly today the species is being hunted and trapped quite intensively in Myanmar (Khin Ma Ma Thwin *in litt.* 1998, B. F. King verbally 1998). Security problems in the north have curtailed any attempts at survey work and provided a ready supply of firearms to the local population (Scott 1989).

MEASURES TAKEN The species receives legal protection in Bhutan, Myanmar (as pheasants in general), China (a first class nationally protected species) and India (Schedule 1). It is listed in CITES Appendix I and international trade in the species is thus essentially outlawed.

Protection of habitat and prevention of hunting Although the species has recently been determined to be present at three protected areas, Intanki and Mehao Sanctuaries and Murlen National Park, India, all of which are considered irreplaceably important for the long-term conservation of East Asian galliforms (McGowan *et al.* 1999), there is actually no confirmed record from Murlen National Park (R. Kaul *in litt.* 2001). It also occurs at another "irreplaceable site" (Blue Mountain National Park) although McGowan *et al.* (1999) did not list it as such. In the account above its presence is documented in several other protected areas and these are detailed below. **China** It occurs in one protected area in China, Nu Jiang Nature Reserve in Yunnan (3,754 km², forests and other habitats in this complex system apparently in very good condition: MacKinnon *et al.* 1996). The species may occur in the Mount Jumulang Ma National Nature Reserve in Tibet (McGowan and Garson 1995). **India** The subspecies *blythii* occurs in the Fakim (6.4 km²), Intanki (56 km²) and Pulebadze (9.2 km²) Wildlife Sanctuaries in Nagaland (Zeliang undated, Choudhury 1997b,c), and Blue Mountain National Park (50 km²) in Mizoram (Katju 1996), although enforcement of legislation is "very much inadequate" (Choudhury 1996i). Establishment of Pulebadze Wildlife Sanctuary was ostensibly to protect habitat as a release site for captive-bred Blyth's Tragopans (Zeliang 1980). The current state of the sanctuary is not known. A population (undetermined subspecies) is present in the Mehao and Dibang Valley Wildlife Sanctuaries in Arunachal Pradesh (McGowan and Garson 1995) although these have little effect at present (Choudhury 1996i). Presence in Namdapha National Park and the adjoining Kamlang Wildlife Sanctuary in Arunachal Pradesh cannot be ruled out although there are no confirmed reports from these areas as yet (cf. Johnsgard 1999). A similar situation applies to Talle Valley Wildlife Sanctuary in Arunachal Pradesh (D. Ghose *in litt.* 1999). There is a ban on hunting in Nagaland between March and October (Zeliang undated) but this is presumably rarely adhered to. **Bhutan** The national forest policy proposes to "ensure primarily the preservation of the environment, and only thereafter derivation of economic benefits that flow from rationally managed resources", and to maintain forests over 60% of the country (Adams 1989). These far-sighted approaches to forestry and the country's environmental heritage go some way to ensuring a safe long-term future for this species. Nevertheless, the species has not been recorded from within any Bhutanese protected area (C. Inskipp *in litt.* 1999). **Myanmar** Mount Victoria lies within Natma Taung National Park (Khin Ma Ma Thwin *in litt.* 1998), although it is not clear how effective this protected area is.

Captivity A centre for captive breeding the subspecies *blythii* was established at Kohima, Nagaland, in 1973 (Howman 1984, Zeliang undated), although it contained only six birds in

1994 after ten birds died in 1993 due to an unidentified disease (R. Kaul *in litt.* 1994). WPA maintains a studbook for captive breeding (McGowan and Garson 1995) but there are no plans for release of birds into the wild.

MEASURES PROPOSED Suitable areas of undisturbed forest with dense undergrowth and steep hillsides must be identified and afforded protection. In particular, the local people living adjacent to areas holding Blyth's Tragopans hold the key to its conservation and they need to be motivated through conservation education, joint area management and development policies.

Protected areas Established wildlife sanctuaries containing Blyth's Tragopan should be upgraded and their protection improved to reduce pressures from hunting and habitat loss on populations of the species (McGowan and Garson 1995). *China* MacKinnon *et al.* (1996) recommended that Nu Jiang Nature Reserve in Yunnan should be managed as part of the Nu Jiang-Lancang Jiang "Convergence Unit". *India* The proposed Barail Biosphere Reserve in Assam, including the North Cachar Hills Reserve Forest and Barail Reserve Forest, would protect populations of this species and should be established at the earliest opportunity (Choudhury 1993d). In Arunachal Pradesh, the Shimong-Singha track supports high-quality habitat for this species and should be considered for protection, as it is currently little disturbed (Singh 1999). The proposed Dihang-Dibang Biosphere Reserve contains some areas near Singha and would thus encompass part of the range of this species, but it would not carry any legal status in India and a wildlife sanctuary or national park sited around Sircum Hill and Singha would be more effective (Singh 1999). Conservation measures in protected areas such as Mehao and Dibang Valley Wildlife Sanctuaries, along with all the reserves of Nagaland, are woefully lacking and this problem should rapidly be addressed (Choudhury 1996i). Choudhury (1997b,c) recommended the establishment of three new protected areas in Nagaland, India: one at Satoi (c.50 km²) where the species still thrives, one in the Japvo-Dzuko valley (c.100 km²), and another at Saramati (c.500 km²), encompassing the existing small sanctuary at Fakim. In addition, village councils in the region should be encouraged to declare some key tragopan sites as village sanctuaries (Choudhury 1997). The proposed national parks at Sirohi and Dzuko in Manipur would also help protect this species as it appears to be common, at least in the former area (Choudhury 1992a, 1996i), but a previous effort by the Manipur government to convert the Sirohi area into a national park was rebuffed by local villagers who legally own the area (Choudhury 1996i). Future attempts should incorporate proper incentives as the villagers are apparently not entirely opposed to the idea and indeed themselves confer some level of protection to the mountain's forests in order to maintain a water supply (Choudhury 1996i). *Myanmar* A protected area in the northern Chin hills of Myanmar is an urgent priority. The new national park at Mt Victoria has the potential to be important for this species and many others, but this is dependent on it being properly managed and protected (King *et al.* 1996).

Control of hunting Forest authorities in Nagaland should monitor and control sale of this species at the wildlife market in Kohima (Choudhury 1997b,c)—clearly a recommendation that applies to markets throughout its range.

Research Extensive surveys are required to establish the species's true distribution and status (McGowan and Garson 1995). These should be targeted in the highlands of northern Myanmar and adjacent Arunachal Pradesh for the subspecies *blythii*, and in east and south-east Bhutan, the northern fringe of Arunachal Pradesh and bordering areas of Yunnan and Tibet for *molesworthi* (McGowan and Garson 1995). Further surveys are required in Arunachal Pradesh to clarify the status and distribution of the species (Singh 1999), particularly west of the Mehao Sanctuary where there are no confirmed records until the Bhutanese border. These surveys are currently being conducted (Ghose and Sumner 1997). Murlen National Park was considered a possible site given its geographical

location and habitat type and should be surveyed accordingly (Kaul *et al.* 1996, R. Kaul *in litt.* 2001).

Very little is known about the life history of this species in China, and studies should be carried out to determine its range and population dynamics, with the aim of developing appropriate measures for its conservation (Zhang Zhengwang *in litt.* 1997).

One field technique that has met with some success at Phawngpui National Park (Ghose 1997), and deserves wider adoption, is the use of tape playback to elicit responses from wild birds; this has also proved effective in locating and censusing Western Tragopan *T. melanocephalus* populations in Himachal Pradesh (Javed *et al.* 1999a; see relevant account, but also Remarks 4).

Education An education programme, designed specifically to reduce hunting pressure, should be initiated in Nagaland, and elsewhere in the species's range, as soon as possible (McGowan and Garson 1995). The Nagaland education programme should be undertaken by NGOs, such as the People's Group, taking advantage of the fact that most villagers are already aware of the importance of the species (Choudhury 1997b,c).

Alternative livelihoods As a general conservation principle, there is an urgent need in Arunachal Pradesh, and presumably many other areas, to provide sustainable economic alternatives to current practices of timber harvesting, tea cultivation and shifting cultivation. This might take the form of ecotourism development, floriculture or cultivation of medicinal plants (Singh 1999).

Captive breeding Cooperation between WPA and Guwahati University has been advised at the Kohima pheasantry to ensure correct management of the captive population (R. Kaul *in litt.* 1994). If a captive stock of *molesworthi* is established, genetic isolation from *blythii* will be needed.

REMARKS (1) The record of this species at Dawang (Moindawang, Dangan La) in "Tibet" has been listed under China (see *Distribution*), but this locality lies very close to the border between India and China (as mapped in TAW 1999). It is possible that this specimen was collected in India rather than China, although in reality the area occupied by this species near Moindawang probably straddles the border between the two countries. (2) As clarified by Ludlow and Kinnear (1937), the type locality of *T. b. molesworthi* was given in error as Tsa La, Tibet, by Baker (1921–1930). He in fact gives the correct location of Dangan La, Tibet, in an earlier work (Baker 1914). The validity of the race *molesworthi* requires review (NJC). (3) Field identification of female tragopans is notoriously difficult (B. F. King verbally 1998) and therefore records of female Blyth's Tragopans should be accompanied with a detailed justification. Sites where only females have been seen should be revisited in an attempt to confirm their identity from males. (4) Unfortunately, calls of Blyth's and Satyr Tragopans are very similar and both species are known to call in response to each other (Howman 1984). This potentially useful survey tool is thus rendered unreliable in areas of sympatry or immediate parapatry.