

Threatened Birds of Asia:

The BirdLife International Red Data Book

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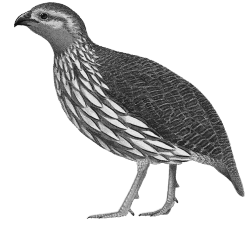
SWAMP FRANCOLIN

Francolinus gularis

Critical ☐ —

Endangered ☐ —

Vulnerable ☒ A1c,d; A2c,d



This species is classified as Vulnerable because it has undergone a rapid population decline which is projected to continue, concurrent with the rapid decline in extent and quality of its specialised habitat. Hunting is an additional pressure.

DISTRIBUTION The Swamp Francolin is endemic to the Indian subcontinent, where it is distributed from northern Uttar Pradesh and southern Nepal, east through northern Bihar and West Bengal to the Brahmaputra valley in north-eastern India and, at least historically, to parts of Bangladesh (Ali and Ripley 1968–1998, Ripley 1982, Inskipp and Inskipp 1991).

■ **INDIA** Among the four members of the genus *Francolinus* in India, this species has the most restricted range, being confined to the tall, wet grasslands of the terai in Uttar Pradesh and Bihar (previously south to the Ganges: Beavan 1865, 1865–1868, Ball 1878), West Bengal, Assam, Meghalaya and Arunachal Pradesh (Ali and Ripley 1968–1998, Grimmett *et al.* 1998). Records are from:

■ **Uttar Pradesh Hastinapur Wildlife Sanctuary**, undated (P. J. K. McGowan *in litt.* 1998), although the species was not heard during recent surveys (S. Javed *in litt.* 2001); **Lagga Bagga**, several calling, May 1988 (Rahmani 1989); **Pilibhit**, June, year unspecified, April 1908, April 1909 (BMNH egg data), on the Sarda river, February 1924 (specimen in BNHS, Abdulali 1968–1996), and recently in various marshes (e.g. Chuka bridge and Jhand) by the Sarda canal, and other areas of Pilibhit district (Javed 2000, S. Javed *in litt.* 1997); on Pallia–Sathiana road, **Ainthpur**, four, March 1998 (Javed 2000); **Dudwa National Park**, listed (Chandola 1978, Singh and Singh 1985), at four of 13 sites, April–May 1990 (Kaul and Kalsi 1990), 27 adults and 27 chicks at 16 sites, January–June 1991 (Javed and Rahmani 1991, Javed *et al.* 1999b), nearby at Ghola marsh, undated (Javed 1993), February 1995 onward (Iqbal 1997), and nearby at Girjapuri barrage, Girjapuri, April–May 1990 (Kaul and Kalsi 1990), present at 20 different localities with good populations at Ghola, Gajrola and Tiger Haven (Javed and Rahmani 1998); **Kishanpur Wildlife Sanctuary**, undated (Ali and Ripley 1968–1998), specifically at Jhadi Tal, April–May 1990 (Kaul and Kalsi 1990), and up to six calling there in March 1998 (Javed 2000); **Katerniaghat Wildlife Sanctuary**, Bahraich district, “very much present”, 1986 (Rahmani and Qurieshi 1991), 1990 (R. Kaul verbally 1990), with two calling at Hanumangarhi and six calling at Kailashpuri in March 1998 (Javed 2000); an unspecified locality in Kheri district, February 1874 (female in BMNH), and at Andeshnagar swamp, 10 km from **Lakhimpur**–Kheri town, January–June 1991 (Javed and Rahmani 1991); Kokargaddi, near **Balrampur**, two, March 1998 (Javed 2000); north-eastern corner of Gorakhpur district, scarce, 1909–1911 (Osmaston 1913), and in this region at **Kalnahi**, Nichlaul, February 1947 (four specimens in FMNH, UMMZ, Koelz 1954), also at unspecified localities in Gorakhpur district, undated (Mukherjee 1977); **Sohagibarwa Wildlife Sanctuary**, undated (A. R. Rahmani verbally 1998), suitable habitat available but not heard during recent surveys (S. Javed *in litt.* 2001); **Basti district**, 1940s (Mukherjee 1977), 1990s (Javed 1996); **Lucknow**, December 1922 (three specimens in AMNH), and at unspecified localities in Avadh (“Oudh”), 1869 (two specimens in BMNH); **Mughal Sarai**, December 1873 (male in BMNH), November 1874 (specimen in BMNH);

■ **Bihar Valmikinagar Sanctuary** (Valmiki Tiger Reserve), 1991 (Javed and Rahmani 1991); **Madhubani**, a pair, March 1904 (Inglis 1901–1904); Baghownie, **Darbhanga district**, April and July 1912 (two specimens in YPM), April 1913 (three eggs in BMNH), January 1918 (specimen in YPM); **Purnea** (Purneah), pre-1876 (three specimens in BMNH); **Karagola ghat** (Kharagola), on the Ganges, undated (Beavan 1865, 1865–1868); **Colgong**, October, undated (Beavan 1865, 1865–1868); **Rajmahal**, undated (Beavan 1865, 1865–1868); **Monghyr district**, undated (Inglis 1901–1904);

■ **West Bengal** Sikkim terai, 1876 (specimen in AMNH), presumably from present-day West Bengal given the distribution of terai habitat; Jalpaiguri district, probable, undated (Beavan 1865), and more recently in this district “often” seen at **Bagrakote**, **Gish** and **Chamurchibazar**, 1940s (Mukherjee 1977); **Sivok**, Darjeeling district, “often”, 1940s (Mukherjee 1977); Buxa duars, centred on **Buxa Duar**, January–February 1878 (two females in BMNH), 3–4 birds in 1956 (Mukherjee 1977); near **Silguri** (Shiliguri), January 1926 (male in BMNH); **Jaldapara Wildlife Sanctuary**, undated (Scott 1989); **Koch Bihar** (Cooch Behar), December 1895 and January 1996 (two specimens in BMNH); **Maldah**, undated (BMNH egg data); vicinity of **Calcutta**, undated (Temminck 1813–1815), 1841–1843 (Blyth 1843b); **Salt lakes**, undated (Anon. 1969b); and Sundarbans area at Baghna block, in the Raimangal-**Jhilla** forest strip, one heard, 1956 (Mukherjee 1977);

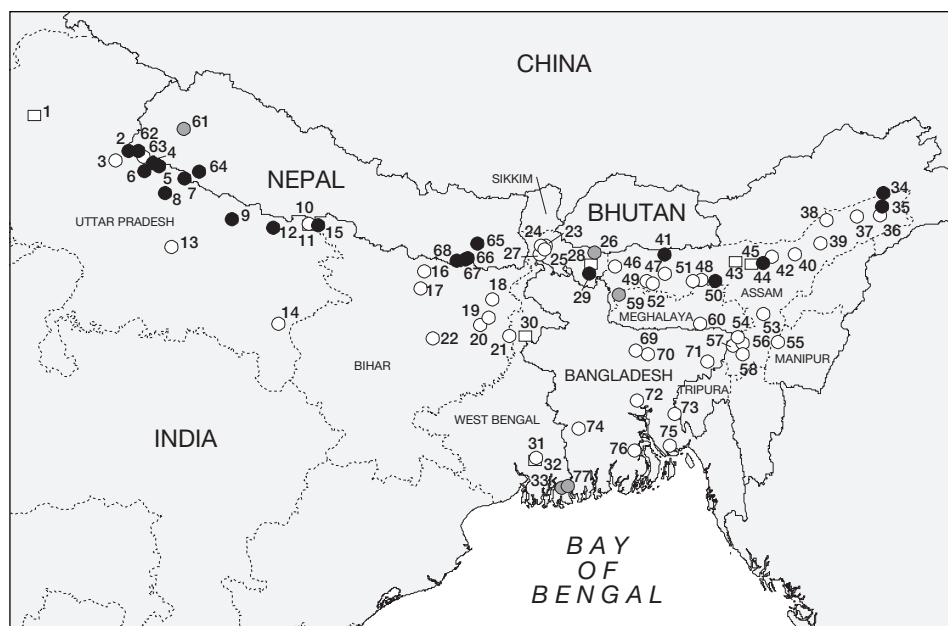
■ **Arunachal Pradesh D’Ering Memorial Wildlife Sanctuary**, two, December 1991, one calling, January 1994 (Singh 1995), January 1996 (Barman 1996);

■ **Assam Dibru-Saikhowa National Park**, undated (Talukdar 1993), calls heard at Amarpur just north of the park, December 1993, calls heard at Raidang and Erasuti chapori (see Remarks 1), March 1994 (Choudhury 1995), “rare” in the park (A. Choudhury 1998a; but see Table 1); **Tinsukia district** (possibly in or near Dibru-Saikhowa National Park), January 1906 (male in MCZ); **Dibrugarh**, October 1903 (specimen in BNHS), March 1903, February 1905 (two specimens in AMNH, Stevens 1914–1915), and more recently in Dihingmukh Reserve Forest, 1990s (Choudhury 2000c); Lakhimpur district, at **Hassemara** (Hessemara), January 1906 (specimens in FMNH and AMNH, Stevens 1914–1915), and more recently at Pabho Reserve Forest, Borchapori area, Khabolu area and Dhakuakhana subdivision, including Orne chapori, Alotiagora, Sampora, Samporamukh, Chela, Bahir Bogori etc., presumably 1990s (Choudhury 2000c); **Komolabari**, Sibsagar, August 1904 (female in BMNH, Stevens 1914–1915); **Dhunsirimukh** (Dhunsirimukh river), probably within Kaziranga National Park, 1901–1911 (Stevens 1914–1915); **Manas National Park**, April 1971 (Aarestrup *et al.* 1971), one, December 1975 (D. A. Scott *in litt.* 2000), 1987 (Rahmani *et al.* 1988; also Anon. 1990b; see Table 1); **Bishnath plain**, base of the Dafla hills, 1874–1875 (Godwin-Austen 1876b); **Orang National Park**, undated (S. Javed *in litt.* 1997; see Table 1); **Kaziranga National Park**, large population present, with records of up to c.15 a day (e.g. Aarestrup *et al.* 1971, Mukherjee 1977, J.-C. Kovacs *in litt.* 1998, Alström *et al.* 1994c, Hornbuckle 1998a, Choudhury 2000c; see Table 1); **Laokhowa** (Lowkhowa) **Wildlife Sanctuary**, undated (S. Javed *in litt.* 1997), and nearby Burhachapori Wildlife Sanctuary, 1990s (Choudhury 2000c; see Table 1); **Gosaigaon river**, 1901–1911 (Stevens 1914–1915); **Barpeta**, undated (Baker 1921–1930); **Gauhati** (=Guwahati), March 1870 (male in BMNH); **Goalpara** (see Remarks 2), February 1904, and breeding in March 1905 (BMNH egg data, male in MCZ), and at the “Santhal colony”, May 1907 (BMNH egg data); **Pobitora** (Pabitora) **Wildlife Sanctuary**, seven seen plus several heard, February 1998 (Hornbuckle 1998a; see Table 1); **Soalkuchi** (Sialkuchi, Loo-al-choochi), c.20 km downriver of Gauhati, May 1871 (Pollok 1879); **Mornai tea estate**, Goalpara, January–February 1907 (specimens in FMNH and YPM); **North Cachar Hills district**, lowlands, undated (Baker 1894–1901), Dhurrumkhal, August 1894 (male in AMNH), Arkuttepore, November 1895 (two specimens in AMNH); Jellapur, here presumed to be **Jalalpur**, Cachar, March 1892 (BMNH egg data); **Dilkushah** (Dilkoosha), Cachar, April 1878 (Hume 1880b, male in BMNH); **western Cachar**, breeding in March, undated (Inglis 1896–1902); **Chutla bhil** (Kuttal), Cachar, 1898

(male in FMNH); near Lallamukh tea estate, **Hailakandi** (Hylakandy) district, Cachar, several, undated (Inglis 1896–1902); Bordoibam-Bilmukh Sanctuary (not mapped), 1990s (Choudhury 2000c; see Table 1); Dhemaji district (not mapped), including Jamjing Reserve Forest, Sengajan Reserve Forest, Kobo chapori, Bordoloni area and chapories along the Brahmaputra, 1990s (Choudhury 2000c; see Table 1); Kochmora Reserve Forest (not mapped), Sonitpur district, 1990s (Choudhury 2000c); Majuli area (not mapped), Jorhat, 1990s (Choudhury 2000c; see Table 1); Nameri National Park (not mapped), 1990s (Choudhury 2000c); Panidihing Sanctuary (not mapped), 1990s (Choudhury 2000c; see Table 1); Jargaon (untraced), two, April 1869 or 1870 (Pollok 1879);

■ **Meghalaya** unspecified localities at the base of the Khasia hills, undated (Baker 1907b); **Phulbari**, Garo hills, breeding, April 1950 (three specimens in UMMZ); **Cherrapunji**, 1,400 m, undated (Godwin-Austen 1870a).

There is one record from an unknown state: “Dakhnu-Bugh” (untraced), pre-1893 (two specimens in NHMW).



The distribution of Swamp Francolin *Francolinus gularis*: (1) Hastinapur Wildlife Sanctuary; (2) Lagga Bagga; (3) Pilibhit; (4) Ainthpur; (5) Dudwa National Park; (6) Kishanpur Wildlife Sanctuary; (7) Katerniaghat Wildlife Sanctuary; (8) Lakhimpur; (9) Balrampur; (10) Kalnahi; (11) Sohagibarwa Wildlife Sanctuary; (12) Basti district; (13) Lucknow; (14) Mughal Sarai; (15) Valmikinagar Sanctuary; (16) Madhubani; (17) Darbhanga district; (18) Purnea; (19) Karagola ghat; (20) Colgong; (21) Rajmahal; (22) Monghyr district; (23) Bagrakote; (24) Sivok; (25) Gish; (26) Buxa Duar; (27) Silguri; (28) Jaldapara Wildlife Sanctuary; (29) Koch Bihar; (30) Maldah; (31) Calcutta; (32) Salt lakes; (33) Jhilla; (34) D’Ering Memorial Wildlife Sanctuary; (35) Dibru-Saikhowa National Park; (36) Tinsukia district; (37) Dibrugarh; (38) Hassemara; (39) Komolabari; (40) Dhunsirimukh; (41) Manas National Park; (42) Bishnath plain; (43) Orang National Park; (44) Kaziranga National Park; (45) Laokhowa Wildlife Sanctuary; (46) Gosaigaon river; (47) Barpeta; (48) Gauhati; (49) Goalpara; (50) Pobitora Wildlife Sanctuary; (51) Soalkuchi; (52) Mornai tea estate; (53) North Cachar Hills district; (54) Jalalpur; (55) Dilkhushah; (56) western Cachar; (57) Chutla bhil; (58) Hailakandi; (59) Phulbari; (60) Cherrapunji; (61) Seti; (62) Royal Sukla Phanta Wildlife Reserve; (63) Bilauri; (64) Royal Bardia National Park; (65) Tribeni; (66) Kosi Tappu Wildlife Reserve; (67) Kosi barrage; (68) Saptari district; (69) Mymensingh; (70) Inayetpur; (71) Sylhet; (72) Dhaka; (73) Comilla district; (74) Jessore; (75) Noakhali; (76) Barisal; (77) Sundarbans.

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

■ **NEPAL** This species was once presumably found throughout the terai belt of Nepal, but its range is now restricted to a few protected areas. Records are from: Seti Bazaar (possibly Satti Bazaar), Kailali, one male, January 1953 (male in FMNH, Rand and Fleming 1957), this presumably the same site as **Seti**, 54 km east of Dhangadhi, one collected, January 1961 (male in FMNH, Fleming and Traylor 1964), one in December, early 1960s (Disselhorst 1968); **Royal Sukla Phanta Wildlife Reserve**, Mahakali, Kanchanpur, early twentieth century (Bailey 1938, R. L. Fleming Sr. 1977b), four, May 1982 (Inskipp and Inskipp 1982), two, March 1993 (Irvin 1994), c.28 in the reserve, early 1990s (H. S. Baral *in litt.* 1997, Baral 1998b) and recorded by many observers down to the present; **Bilauri** (Belauri), January 1937 (female in BMNH, Bailey 1938); **Royal Bardia National Park**, one, March 1986 (Roberts 1990), but none since despite extensive fieldwork (H. S. Baral *in litt.* 2000, N. B. Peet *in litt.* 2001); **Tribeni** (Triveni), just outside the south-western boundary of Royal Chitwan National Park, November 1935 (Bailey 1938), and in early 2000 (H. S. Baral *per C. Inskipp in litt.* 2000); **Kosi Tappu Wildlife Reserve**, common, with regular records of 5–20 per day (e.g. Hornskov 1984, Heath 1986, Thorns 1987, Kovacs 1988, Dodman and Guinan 1989, Nielsen and Jacobsen 1989, Dodman 1992, Nielsen 1993, Flack 1994, Weiss and Wettstein 1994, Wheeldon 1995, Daulne and Goblet 1996); **Kosi barrage**, one, March 1981 (Inskipp and Inskipp 1981a), one, February 1985 (Hurrell 1988), two, April 1985 (Harrap 1985), two, February 1987 (Eve and Hibberd 1987), a pair, March 1996 (Davidson and Heywood 1996); branch road leading to Rajbiraj, **Saptari district**, north of the East–West Highway, undated but presumably 1980s (J. O. M. Roberts *per C. Inskipp in litt.* 1986).

■ **BANGLADESH** Historically, the species was quite widespread, with records from Sylhet and Comilla (=Tippera) districts, the course of the Ganges and Meghna, coastal Sundarbans districts and the lowlands of Chittagong (Baker 1922–1930). Records are from: base of the **Mymensingh** hills, undated (Simson 1882); Kushiara river, below “Inayetgunj”, here presumed to be **Inayetpur**, one collected, probably February 1874 (*Stray Feathers* 2 [1874]: 457–458); **Sylhet**, August 1875 (female in BMNH), and foot of the Sylhet hills, undated (Simson 1882), pre-1889 (female in BMNH); **Dhaka** (Dacca), 1869–1870 (two specimens in BMNH); **Comilla district** (=Tippera), nesting, undated (Baker 1921–1930); **Jessore**, Khulna, breeding, April 1875 (BMNH egg data, Hume and Oates 1889–1890); **Noakhali**, Chittagong, uncommon (Baker 1922–1930); **Barisal**, nesting, undated (Baker 1921–1930); not occurring in the **Sundarbans** according to Blanford (1895–1898), but later thought common there, undated (Baker 1922–1930), with subsequent reports of four, November 1967 (Mountfort and Poore 1968), two, 1982 (Sarker 1986a), and possibly recorded, April 1971 (Hendrichs 1975), but not during many recent visits (P. M. Thompson *in litt.* 1998); **Bunser river** (untraced), north-west of Dhaka, one at a large jheel nearby, pre-1880 (Simson 1882); **Gazny**, Mymensingh, (unconfirmed), where the species “seems to occur” (Sarker 1986a).

POPULATION The global population was recently estimated at 1,000–10,000 individuals (McGowan *et al.* 1995). However, the species remains locally common in many areas and is undoubtedly more abundant than these figures suggest, with the population in Assam alone now thought to approach or possibly exceed 10,000 (Choudhury 2000c). The ongoing clearance, fragmentation and degradation of terai grasslands (see below and Threats under Bengal Florican *Houbaropsis bengalensis*) nevertheless suggests that the Swamp Francolin has declined rapidly in the recent past, and may well continue to do so.

India In the nineteenth century, the Swamp Francolin was plentiful near the Ganges in Bihar (Beavan 1865–1868). In the north-eastern states it was “very common throughout the plains of Cachar in suitable localities” (Assam) (Baker 1894–1901), “plentiful” in north-east Cachar (Hume 1880b), “common” at the base of the Khasia hills (Meghalaya) (Baker 1907b), and “very plentiful” on the Bishnath plain, at the foot of the Daffa hills (Godwin-Austen

1876b). It was also recorded once in the highlands of the Khasia hills (Godwin-Austen 1870a), but Baker (1922–1930), who lived many years in that district without encountering the species, concluded that it must be very rare there. Although regarded as scarce in the Gorakhpur district, Uttar Pradesh (Osmaston 1913), it was generally a common and widespread bird in the grasslands of northern India until the twentieth century (Hume and Oates 1889–1890, Baker 1921–1930, 1922–1930).

It became apparent in the latter half of the twentieth century that a considerable decline had taken place, prompting concern regarding the survival prospects of the species (Mukherjee 1977, Javed 1993, 1996). Although it once occurred in the vicinity of Calcutta and in the Sundarbans regions, for example, it has apparently totally disappeared from southern West Bengal (Mukherjee 1977, Baral 1998b). Similarly, despite its earlier abundance in Cachar, Assam, it is now considered unlikely to persist there (Choudhury 2000c). Fortunately, fears that this disappearance was being mirrored throughout the species's range were shown to be unwarranted by the results of surveys in the 1980s and 1990s, with results indicating that, "with its very wide distribution, present level of population and good breeding success", it "occurs in far greater numbers than supposed" (Javed and Rahmani 1991). Indeed it is apparently present in all protected terai grasslands that fall within its range (A. R. Rahmani *in litt.* 1999). Nevertheless, the habitat preferred by the species is sufficiently threatened that conservation measures are deemed necessary if its long-term future is to be secured (Javed and Rahmani 1991).

In Uttar Pradesh, the largest populations survive in Pilibhit Wildlife Sanctuary, Kishanpur Wildlife Sanctuary and Dudwa National Park (plus a "fairly good population" at Ghola marsh nearby) (Javed 1993). Surveys in the terai of north India (Uttar Pradesh, Bihar, West Bengal) in 1998 encountered 136 calling birds (taken to imply 136 pairs) (Javed 2000). In Bihar the Valmikinagar Sanctuary supports good numbers, and in West Bengal Jaldapara Wildlife Sanctuary contains a few individuals (S. Javed *in litt.* 1999).

One of the most important populations of the species survives in the grasslands of the Brahmaputra valley, Assam, where it occurs at a minimum of 30 localities (11 of which are protected), sometimes in fairly high numbers (Choudhury 2000c; see Table 1). It is, for example, "found commonly" in Kaziranga National Park (Barua and Sharma 1999) and the large population in this protected area is of crucial importance to the species. The total population in Assam, based on calling surveys in the 1990s, is roughly estimated as 7,800–11,800 individuals, around 75% of which are thought to survive inside key protected areas (see Table 1), with 25% in unprotected grassland patches, including 1,100–1,500 in Dhemaji district, 400–700 in Lakhimpur district, 100–200 in Jorhat district, 50+ in Dibrugarh district and 100+ in Tinsukia district (Choudhury 2000c). In Arunachal Pradesh a small population

Sanctuary/Area	Population	Period
Kaziranga National Park	3,500–4,500	1994–1998
Manas National Park	1,500–3,000	1994–1998
Orang National Park	450–600	1994–1998
Burhachapori Wildlife Sanctuary–Laokhowa Wildlife Sanctuary	200–350	1996–1998
Pobitora Wildlife Sanctuary	150–300	1994–1998
Kobo chapori, Dhemaji district	100–200	1990–1994
Bordoloni, Dhemaji district	100–150	1990–1995
Borchapori, Lakhimpur district	100–150	1990–1995
Dibru-Saikhowa National Park	50–150	1992–1996
Majuli, Jorhat district	50–150	1990–1995
Borboidam-Bilmukh Sanctuary	50–100	1990–1995
Panidihing Sanctuary	50–100	1994–1998
Amarpur	c.50	1992–1994

Table 1. Recent population estimates for Swamp Francolin at key sites in Assam (following Choudhury 2000c).

also occurs in the D'Ering Memorial Wildlife Sanctuary, with suitable habitat stretching to the east (Singh 1995).

Nepal The population in Nepal has been estimated at fewer than 500 birds with a possible gradual decline (H. S. Baral *in litt.* 1997). Although there is little direct evidence of any ongoing population change (C. Inskipp and T. P. Inskipp verbally 1998), the huge overall loss of terai grasslands in the country implies that numbers must have fallen dramatically in the longer term (Shrestha 1992, Baral 1998b). The vast majority of birds now occur in only two sites, Kosi Tappu Wildlife Reserve and Royal Sukla Phanta Wildlife Reserve; but the species seems to have increased in the former (Baral 1998b). It was previously thought uncommon in the Kosi area, with initial reports of only a few individuals (up to three: Hornskov 1984, Inskipp and Inskipp 1991). However, the population appears to have increased there since 1986 (Roberts 1990, Inskipp and Inskipp 1991). It is now described as fairly common at Kosi Tappu Wildlife Reserve (Inskipp and Inskipp 1991, Baral 1998b), with up to 28 birds seen in a day (Nielsen and Jacobsen 1989, Baral 1998b) and an estimated total population of 178 adult birds at Kosi Tappu and Kosi barrage in 1991–1995 (Baral 1998b). It remains rare (not more than 10 birds) at Kosi barrage because of high hunting pressure (Inskipp and Inskipp 1981a, Eve and Hibberd 1987). The eastern part of the embankment at Kosi Tappu supports more than 80% of the reserve's population and the rest is scattered in the reserve and the barrage (H. S. Baral verbally 1998). The population of Royal Sukla Phanta Wildlife Reserve was estimated at 28 birds (Baral 1998b), but could well be over 100 (Baral 2000b).

Bangladesh The species was described as common along the Buser river upstream of Dhaka, "exceedingly numerous" between 1860 and 1880 in the hills of Sylhet and Mymensingh (Simson 1882) and "common" in Sylhet and Tippera (now Comilla) districts and the Sundarbans (Baker 1921–1930, 1922–1930, Sarker 1986a). During the 1880s, it was believed to be "not uncommon" in Jessore, Khulna, Barisal and Mymensingh, but "not common" in Chittagong (Baker 1921–1930, 1922–1930). Despite its earlier abundance, it is now very rare and quite possibly extinct (Khan 1982, Karim undated, Harvey 1990). It has not been recorded in the Sundarbans during many recent visits in recent years and is probably extinct in the area (P. M. Thompson *in litt.* 1998). It might still occur in small numbers in unsurveyed marshlands (Harvey 1990, P. M. Thompson *in litt.* 1997, Grimmett *et al.* 1998).

ECOLOGY Habitat The species generally inhabits swampy or riverine grassland (Baker 1921–1930) in the lowlands, although there is a record from the Cherrapunji plateau at 1,400 m (Godwin-Austen 1870b). It is commonest within 200 m of water (Javed *et al.* 1999b) and has unusually long legs for the genus, allowing it to wade through water with ease (Finn 1915). It tolerates several different grassland structures (Javed *et al.* 1999b), including tall riverine grasslands, shorter *Imperata*-dominated grasslands and mixed short and tall grassland (Javed and Rahmani 1991, Singh 1995, Baral 1998b). In India its strongest association is with the tall wet grassland containing *Phragmites karka*, *Arundo donax*, *Themeda arundinaceum*, *Narenga porphyrocoma*, and particularly *Sclerostachya fusca* and *Saccharum* (except *S. munja* [= *bengalense*]) (Javed *et al.* 1999b). In D'Ering Memorial Wildlife Sanctuary habitat consists of seasonally inundated grasslands (mainly *Imperata*, *Saccharum* and *Phragmites*), amongst scattered growth of *Ziziphus* and patches of forest; the few records have come from areas of *Imperata* grassland (Singh 1995). It is also found in canebrakes, scrub and thorn bushes bordering marshy ground (Baker 1921–1930).

In Nepal it is found in tall and moist grasslands, preferring those with an average height of 2–3 m and some clear patches (Baral 1998b). In Kosi Tappu Wildlife Reserve it occurs in wet grassland dominated by *Saccharum spontaneum* and *Phragmites karka* and also on embankments with scrub and trees including *Dalbergia sissoo*, *Ziziphus mauritania* and *Cassia tora* (Baral 1998b, N. B. Peet *in litt.* 2001). Tall grasslands around rivers and lakes were also utilised in

Bangladesh, and were dominated by ekra (ikora) *Erianthus ravaneae*, nal “*Orundo karka*” (presumably either *Phragmites karka* or *Arundo donax*), ullu *Saccharum cylindricum* (possibly *Saccharum* or *Imperata cylindrica*), hogla *Typha elephantina* and hargoza *Acanthus ilicifolius* (Baker 1922–1930). Birds moved to cultivated areas during times of flood (Baker 1922–1930) and were occasionally seen on tidal banks (Martin 1995). The species apparently once abounded in the “rose-bush jungles at the foot of the Mymensing and Sylhet hills” (Simson 1882), although this appears to be an unusual habitat. It has elsewhere been reported from “impenetrable thorny thickets” comprising *Calamus*, *Xanthium*, *Mimosa pudica*, *Tamarix dioica*, *Melastoma*, *Cassia* mixed with climbers (e.g. *Vitis*, *Mikania*, *Smilax*, *Mucuna*) (Mukherjee 1977).

Rank grassland not burnt for two to three years becomes thickly tangled with dead and live material and is avoided by Swamp Francolins (Iqbal and McGowan 1999, Javed *et al.* 1999b). Immediately after grasslands are burnt, birds move to nearby unburnt patches (Javed *et al.* 1999b). Within a week of burning, however, they are distributed in both burnt and unburnt patches, and indeed often show a preference for the former, although they still require unburnt patches for cover (Javed *et al.* 1999b). The species tolerates low-intensity grazing but tends to avoid moderately or heavily grazed grasslands (Javed *et al.* 1999b). During floods it moves upslope to slightly different grassland types (Javed *et al.* 1999b).

Swamp Francolins will utilise agricultural areas, usually sugarcane *Saccharum officinarum* or (especially when ripening) rice *Oryza sativa*, interspersed with wetlands and natural vegetation (Baker 1921–1930, Javed 1993, Javed *et al.* 1999b; also P. Iqbal verbally 1998). All records in croplands have been within 200 m of natural marshes (Javed *et al.* 1999b). However, it is unlikely that crops can replace natural wet grassland habitat, as they are probably only used as a temporary refuge (Javed 1993). Furthermore, although nesting has been recorded in agricultural fields, breeding success appears to be low as a result of human disturbance (Iqbal and McGowan 1999).

The species is found in groups of up to 10, although adult birds are most often found in pairs (Javed *et al.* 1999b). They fly reluctantly, and usually only if nearly stepped on (Godwin-Austen 1876b). However, they are highly vocal, with a peak in calling at dawn and dusk that increases during the breeding season (Javed 1996). Birds clamber for prolonged periods amongst tall reeds (Baker 1921–1930) and may roost in reeds (Stevens 1914–1915).

Food The species is omnivorous, consuming seed and grain, as well as sprouting shoots of mustard, paddy and other crops, and insects, snails, worms, shellfish and small crabs (Baker 1921–1930, 1922–1930). In the Sundarbans it has been recorded following the ebb tide in creeks to feed on small fish (including mudskippers), shrimps and crabs left stranded by the receding water (Martin 1995).

Breeding It breeds from April to June in Nepal, where chicks have been seen in May at Sukla Phanta (Baral 1998b). Elsewhere, most eggs are laid between the end of March and early April, and some as early as February (Baker 1921–1930, BMNH egg data). In Dudwa National Park most hatching takes place before the onset of the monsoon in late May or early June (Javed 1996). Eggs were laid in captivity in north-east India in March and April (Inglis 1921). Nests are placed in tall grassland, sometimes above shallow standing water up to 45 cm deep (Baker 1921–1930); they have been found in nal (either *P. karka* or *A. donax*) (Baker 1921–1930), amongst *Andropogon serratum* and *Saccharum spontaneum* grassland (Hume and Oates 1889–1890), and on small half-submerged islands covered with canebrakes and a dense undergrowth of weeds and rank grass (Baker 1921–1930). Of six nests located in Uttar Pradesh, two were in grassland, three in disused and overgrown sugarcane fields and one in a sugarcane crop (Iqbal and McGowan 1999). Pairs kept in captivity in Bihar nested at the base of clumps of *Erianthus ravaneae* (Inglis 1921). Nests consist of a thick pad of rushes, grass and weeds, 20–30 cm across and 5–10 cm deep with a shallow, well-made hollow for the eggs (Baker 1921–1930). When the nest is placed on dry margins of wetlands, it is apparently less carefully constructed and compact (Baker 1921–1930). On average, five chicks

(range 2–8) are raised (Javed 1996), although Baker (1921–1930) considered 3–4 eggs normal. Chicks are precocial, becoming highly active in a few days and following their parents around, catching insects and feeding themselves (Javed 1996).

Migration The species is doubtless resident (Ripley 1982), although rising floods displace populations over short distances (Baker 1922–1930).

THREATS The Swamp Francolin has declined as a result of extensive habitat loss compounded by hunting, and these factors continue to threaten the species.

Habitat loss, modification and disturbance Virtually all remaining grasslands within the species's range are subject to intense pressures from encroachment by people (settlement and agriculture), domestic livestock, grass harvesting, fire, forestry and hydrological schemes (Rahmani 1988b, 1992c, Javed and Rahmani 1991, Bell and Oliver 1992, Peet *et al.* 1999a). In many areas grasslands of conservation value are restricted to protected areas but continue to suffer degradation (Bell and Oliver 1992, Peet 1997), and grasslands are generally poorly represented in protected-area systems (Rahmani 1988b, 1992c, Eames 1997, Baral 1998b). An account of general threats to grasslands in Nepal and India appears under Bengal Florican.

India Over the latter half of the twentieth century, large-scale conversion of terai grasslands into cropland has taken place (Javed and Rahmani 1991). Plantation of commercially important trees such as *Eucalyptus*, *Dalbergia sissoo* and *Bombax ceiba* has further impinged on large areas of this habitat (S. Javed *in litt.* 1997). Terai grassland once extended over 12 districts of Uttar Pradesh, but is now confined to six: Lakhimpur, Basti, Gorakhpur, Bahraich, Pilibhit and Gonda (Javed 1996). Unsustainable grazing pressure is also deleterious to Swamp Francolin habitat and is rampant throughout the Indian subcontinent as the livestock population continues to grow; grazing is especially damaging in summer when post-burn re-growth emerges and water distribution is limited (moreover, this period coincides with chick rearing in the francolins) (Rahmani 1988b). Even in protected areas overgrazing is a major problem (Rahmani 1988b, Samant *et al.* 1995).

Lagga Bagga Sanctuary (Uttar Pradesh), adjacent to Royal Sukla Phanta in Nepal, until recently contained pristine grasslands, but by promising land to encroachers, local politicians apparently generated an influx of people into the area with the result that deforestation and grazing were increasing rapidly a decade ago (Rahmani and Qurieshi 1991). Poor protection has also led to the reduction of grassland habitat in Valmikinagar Sanctuary, where plantations have replaced much of the area previously suitable for the Swamp Francolin (Rahmani and Qurieshi 1991). Dudwa National Park is threatened by rising anti-tiger sentiments apparently stirred by local politicians keen to exploit potential gains should the park be reduced in area (Scott 1989). Furthermore, serious encroachments have taken place, increasing the conflict between people and tigers with the result that the buffer zone and park borders are in jeopardy of official contraction (Scott 1989). Katarniaghat Sanctuary is threatened by grazing of domestic livestock, poaching and illegal burning (Scott 1989).

Two factors have, however, raised some qualified optimism about the species's future. (1) The development of canals and dams (e.g. the Sharda Sagar dam and canals in Pilibhet Reserve Forest, Girija barrage in Katarniaghat Wildlife Sanctuary), and their resultant seepage marshes, has provided habitat for Swamp Francolins, although the numbers involved are probably small and most of these sites are isolated from each other by forest or agricultural fields (Kaul and Kalsi 1990, Javed and Rahmani 1991). However, the damage to and loss of grasslands caused by dams have been extensive. (2) The species has been found calling and even nesting in sugarcane crops (Iqbal and McGowan 1999). However, breeding success appears to be low in this habitat owing to human disturbance, and the species almost certainly requires access to less disturbed habitats (Iqbal and McGowan 1999).

Nepal Grasslands in the terai of Nepal have declined in area and quality, particularly since the virtual eradication of malaria in the terai in the 1950s (Peet 1997). Since this period

there has been rapid human population growth, and large areas of grassland have been lost to settlement, conversion to agriculture, forestry and flood control (Bell and Oliver 1992, Peet 1997). Outside protected areas virtually no grasslands capable of supporting threatened birds remain, as most are heavily grazed by domestic livestock, harvested for cane or thatch and subject to overwhelming levels of human disturbance (Peet 1997). Tall (up to 5 m) grasslands, dominated by the genera *Erianthus*, *Narenga*, *Saccharum*, *Phragmites* and *Themeda*, and shorter grasslands, dominated by *Imperata cylindrica*, remain in the four protected areas of Royal Chitwan and Royal Bardia National Parks and Royal Sukla Phanta and Kosi Tappu Wildlife Reserves (Peet *et al.* 1999a, Lehmkuhl 1994, Baral 2000b). Within these protected areas grasslands are threatened by several problems (see Threats under Bengal Florican).

At the key site of Kosi Tappu Wildlife Reserve grazing by domestic stock is a major threat, with c.5,000 cattle and 3,000 buffalo present (*Oriental Bird Club Bull.* 21 [1995]: 15–20), leading to severe habitat degradation in parts of the reserve; the problem is complicated by land right claims (N. B. Peet *in litt* 2001). The reserve lies between two large embankments around the Sapta Kosi river; whilst the grasslands are maintained by partial inundation during the monsoon, they are also vulnerable to erosion during floods (Dodman 1992, Peet *et al.* 1999a) and there are then few refugia available to francolins (N. B. Peet *in litt.* 2001).

New localities holding the species have been found in and around Royal Sukla Phanta Wildlife Reserve, but some (e.g. the Jhilmila grasslands) are heavily disturbed and overgrazed and the population in these areas may have declined (Baral 1997b). There are too few guards covering the area, and they are unable to control the influx of people and domestic livestock; more than 100 domestic buffalo were grazing in Dudhiya phanta (part of the reserve) in May 1997 (Baral 1997b).

Bangladesh The rapidly increasing human population has caused widespread damage to and disturbance of natural habitats and a loss of indigenous wildlife (Karim undated, Sarker 1986a). There are now very few, if any, extensive patches of grassland in Bangladesh and any that might remain are inundated for two-thirds of the year with no alternative refugia available (P. M. Thompson *in litt.* 1993). Most remaining grassland areas are fragmented, heavily used and harvested up to three times a year (P. M. Thompson *in litt.* 1997, 1999). Furthermore, the reedlands of north-east Bangladesh were leased out for paper production and are reported to have been entirely destroyed and settled by encroachers (P. M. Thompson *in litt.* 1997, 1999). The Sunderbans are disturbed throughout the year by “a large number of wood cutters, fishermen, honey collectors, wooden boats and mechanical vessels” (Sarker 1985), all activities that are deemed a threat to the Swamp Francolin if it survives in the area (Sarker 1986a).

Hunting and trade India During the British occupation of India, large numbers of gamebirds were shot and the species was trapped for food (Baker 1922–1930). On account of its pugnacious disposition it was, and apparently still is, a favourite with locals for partridge fighting and many are caught, hatched or traded for this purpose (Baker 1921–1930, Ahmed *in prep.*). Trapping and hunting remain serious threats; in Nepalganj and Pilibhit, for example, the species is apparently “quite often caught for food and aviculture” (Ahmed *in prep.*). Currently, there are approximately 70,000 human families reliant on the trading of wild birds in Uttar Pradesh, a statistic that hangs gloomily over the future of this species and others susceptible to trapping and hunting (Rahmani 1995a). **Nepal** The influx of people into the terai resulted in a “destructive period”, especially between 1960 and 1975, when animals such as Swamp Francolins were hunted wantonly (Baral 1998). Hunting is apparently increasing again in the Kosi area (C. Inskipp and T. P. Inskipp verbally 1998). In addition, Shakya (1995) listed several pressures on birds in Nepal, including capture of galliforms for cock-fighting, bird meat (particularly to traders from Bihar, India), medicinal purposes and the cagebird trade. **Bangladesh** Indiscriminate killing and trapping of birds, particularly since the partition of India in 1947, have reduced their populations (Karim undated). Legislation

intended to control hunting remains ineffective (Sarker 1986a). Eggs and chicks of most birds are collected for food (Sarker 1986a) and, as in India, the species was commonly collected for cock-fighting (Baker 1921–1930, 1922–1930; see Remarks 3).

Natural predation In Kosi Tappu Wildlife Reserve the population of jackals, foxes, mongooses and cats may reduce breeding success (H. S. Baral *in litt.* 1998), although predators are only likely to threaten small fragmented populations or be a problem where predators are at unnaturally high densities.

Pesticides Agricultural pesticides may be affecting its numbers either by direct mortality or by reduction of its invertebrate prey (A. R. Rahmani *in litt.* 1999).

MEASURES TAKEN McGowan *et al.* (1999) listed the species from Corbett, Dudwa and Manas National Parks, India, in their analysis of a minimum network of protected areas in East Asia. It does, however, occur in many more protected areas throughout its range.

India The Swamp Francolin is protected under the Wildlife Act 1972 (Schedule IV). It is listed from 15 protected areas in India, ranging in size from 11 km² to 614 km² although the extent of available habitat within these areas is not known (Rahmani and Qamar 1993, R. Kaul *in litt.* 1998): Dibru-Saikhowa (340 km²), Dudwa (488 km²), Kaziranga (850 km²; including 1999 additions: Choudhury 2000c), Manas (500 km²) and Orang National Parks (79 km²), and D’Ering Memorial (190 km²), Jaldapara (216.5 km²), Hastinapur (2,073 km²), Kishanpur (227 km²), Lagga Bagga, Laokhowa (70 km²), North Pilibhit, Pobitora (39 km²), Sohagibarwa (428 km²), and Valmikinagar Wildlife Sanctuaries (544 km²). The account above also lists Bordoiban-Bilmukh Sanctuary (11 km²), Burhachapori Wildlife Sanctuary (44 km²), Nameri National Park (200 km²) and Panidihing Sanctuary (34 km²). A captive breeding programme has been initiated by the Uttar Pradesh Forest Department (Rahmani 1992c).

Nepal The species is officially protected in Nepal. It occurs in two protected areas: Royal Sukla Phanta (155 km²) and Kosi Tappu Wildlife Reserves (175 km²)—Kosi barrage lies close to the latter but outside its boundaries (C. Inskipp and H. S. Baral verbally 1998). It has probably been extirpated from Royal Chitwan and Royal Bardia National Parks (Baral 1998b). Whilst it utilises areas of planted *Dalbergia sissoo* trees and associated scrub in Kosi Tappu, the planting has occurred on raised river embankments, and tree planting should not be encouraged in the grasslands themselves.

Bangladesh The equivalent section under Lesser Adjutant *Leptoptilos javanicus* treats conservation activities in the Sundarbans (although until proof emerges of the francolin’s survival there these will not be of any relevance).

Research A considerable number of studies have improved knowledge of the distribution, status and ecology of this species in Nepal and India, resulting in a large quantity of published data of relevance to protected-area management (see, e.g., Kaul and Kalsi 1990, Shreshta 1992, Iqbal *et al.* 1995, McGowan *et al.* 1995, Baral 1998b, Javed 2000).

MEASURES PROPOSED The conservation requirements of the Swamp Francolin should be viewed in combination with the needs of a variety of other threatened grassland birds within its range, so that a programme of habitat management and research can be implemented with benefits to each of these species (see Measures Proposed under Bengal Florican *Houbaropsis bengalensis*). As suitable grasslands are so restricted in area and distribution, further research must be coupled with direct action to strengthen the measures that ensure their protection (Peet *et al.* 1999a).

India Habitat management and protection are vital to securing the species’s future (see Measures Proposed under Bengal Florican). Where grassland burning is necessary to maintain habitat suitable for the Swamp Francolin it should be carried out before the breeding season, and patches should remain unburnt to provide cover (Javed *et al.* 1999). The species breeds in the Indian terai between February and April, and grasslands should be burnt in January

or early February (Javed *et al.* 1999b). Burning then will not adversely affect nesting, and a mosaic of burnt and unburnt patches will provide sufficient cover and foraging habitat (Javed *et al.* 1999b).

Lagga Bagga (Uttar Pradesh, India), which is contiguous with Royal Sukla Phanta Wildlife Sanctuary in Nepal, should be protected through a cooperative agreement between the two countries (Rahmani 1989). In Assam, roughly 65% of potential habitat is thought to be protected, but effective protection for Amarpur and Kobo chapori would be valuable (Choudhury 2000c). Socio-economic studies of wild bird traders in Uttar Pradesh and elsewhere in the country are required to investigate the impact on bird populations and potential alternative livelihoods for local people (Rahmani 1995a).

In general, surveys and evaluation of grasslands in the Indian subcontinent are required to assess faunal distribution and ecology and the effects of overgrazing and afforestation (Rahmani 1988b). Fortunately, much of this type of research on Swamp Francolin distribution, behaviour and ecology has already been completed or is in progress (see, e.g., Baral 1998b, Javed *et al.* 1999b, Javed 2000). Monitoring of francolin populations at known localities, as well as searches for the species in new areas, should make use of the dawn and dusk calling of males (Kaul and Kalsi 1990, Javed 1993).

Nepal Habitat protection and management and the prevention of hunting are the key conservation measures required. Management recommendations for the protection of grasslands in the country appear in the equivalent section under Bengal Florican. Cutting and burning of tall grassland in protected areas is probably beneficial in maintaining grassland habitat and preventing the development of a thick litter layer (Javed *et al.* 1999b), although birds still require unburnt areas for cover (Javed *et al.* 1999b); rotational management to leave patches of cover would therefore be beneficial. Habitat protection is urgently needed at Kosi Tappu Wildlife Reserve to prevent grazing by domestic stock and further grassland degradation, and additional guard posts between Kushaha and Prakashpur and increased patrolling outside the reserve area are required to suppress hunting pressure (Bhandari 1998). The Jhilmila grasslands near Royal Sukla Phanta Wildlife Reserve also require protection from grazing (Baral 2000b); recent or planned extensions to the reserve are less urgent than effective management of the existing area, which is poorly protected and frequently overrun by domestic livestock (Baral 1997b).

Bangladesh Surveys are required in areas where the species was once common and where grasslands still remain, particularly in Sylhet and the Sundarbans. In such fieldwork, the birds' distinctive call should be listened for, or recorded vocalisations played to elicit a response. Surveys in the north of the country should incorporate searches for Marsh Babbler *Pellorneum palustre* and Black-breasted Parrotbill *Paradoxornis flavirostris* (see relevant accounts).

REMARKS (1) A chapori is a seasonally flooded riverine grassland, either on river islands or adjacent floodplains. (2) This area includes present-day Dhubri and Kokrajhar districts. (3) Interestingly, the eggs of both this species and the Watercock were traditionally incubated by humans in Sylhet who wound them against their bellies with cloth, carrying them thus "day and night" until they hatched (Baker 1921–1930).