

Threatened Birds of Asia:

The BirdLife International Red Data Book

Editors

N. J. COLLAR (Editor-in-chief),
A. V. ANDREEV, S. CHAN, M. J. CROSBY, S. SUBRAMANYA and J. A. TOBIAS

Maps by

RUDYANTO and M. J. CROSBY

Principal compilers and data contributors

■ **BANGLADESH** P. Thompson ■ **BHUTAN** R. Pradhan; C. Inskipp, T. Inskipp ■ **CAMBODIA** Sun Huan; C. M. Poole ■ **CHINA** ■ **MAINLAND CHINA** Zheng Guangmei; Ding Changqing, Gao Wei, Gao Yuren, Li Fulai, Liu Naifa, Ma Zhijun, the late Tan Yaokuang, Wang Qishan, Xu Weishu, Yang Lan, Yu Zhiwei, Zhang Zhengwang. ■ **HONG KONG** Hong Kong Bird Watching Society (BirdLife Affiliate); H. F. Cheung; F. N. Y. Lock, C. K. W. Ma, Y. T. Yu. ■ **TAIWAN** Wild Bird Federation of Taiwan (BirdLife Partner); L. Liu Severinghaus; Chang Chin-lung, Chiang Ming-liang, Fang Woei-horng, Ho Yi-hsian, Hwang Kwang-yin, Lin Wei-yuan, Lin Wen-horn, Lo Hung-ren, Sha Chian-chung, Yau Cheng-teh. ■ **INDIA** Bombay Natural History Society (BirdLife Partner Designate) and Sálím Ali Centre for Ornithology and Natural History; L. Vijayan and V. S. Vijayan; S. Balachandran, R. Bhargava, P. C. Bhattacharjee, S. Bhupathy, A. Chaudhury, P. Gole, S. A. Hussain, R. Kaul, U. Lachungpa, R. Naroji, S. Pandey, A. Pittie, V. Prakash, A. Rahmani, P. Saikia, R. Sankaran, P. Singh, R. Sugathan, Zafar-ul Islam ■ **INDONESIA** BirdLife International Indonesia Country Programme; Ria Saryanthi; D. Agista, S. van Balen, Y. Cahyadin, R. F. A. Grimmett, F. R. Lambert, M. Poulsen, Rudyanto, I. Setiawan, C. Trainor ■ **JAPAN** Wild Bird Society of Japan (BirdLife Partner); Y. Fujimaki; Y. Kanai, H. Morioka, K. Ono, H. Uchida, M. Ueta, N. Yanagisawa ■ **KOREA** ■ **NORTH KOREA** Pak U-il; Chong Jong-ryol, Rim Chuyon. ■ **SOUTH KOREA** Lee Woo-shin; Han Sang-hoon, Kim Jin-han, Lee Ki-sup, Park Jin-young ■ **LAOS** K. Khounbolin; W. J. Duckworth ■ **MALAYSIA** Malaysian Nature Society (BirdLife Partner); K. Kumar; G. Noramly, M. J. Kohler ■ **MONGOLIA** D. Batdelger; A. Bräunlich, N. Tseveenmyadag ■ **MYANMAR** Khin Ma Ma Thwin ■ **NEPAL** Bird Conservation Nepal (BirdLife Affiliate); H. S. Baral; C. Inskipp, T. P. Inskipp ■ **PAKISTAN** Ornithological Society of Pakistan (BirdLife Affiliate) ■ **PHILIPPINES** Haribon Foundation for Conservation of Natural Resources (BirdLife Partner); N. A. D. Mallari, B. R. Tabaranza, Jr. ■ **RUSSIA** Russian Bird Conservation Union (BirdLife Partner Designate); A. V. Andreev; A. G. Degtyarev, V. G. Degtyarev, V. A. Dugintsov, N. N. Gerasimov, Yu. N. Gerasimov, N. I. Germogenov, O. A. Goroshko, A. V. Kondrat'ev, Yu. V. Labutin, N. M. Litvinenko, Yu. N. Nazarov, V. A. Nechaev, V. I. Perfil'ev, R. V. Ryabtsev, Yu. V. Shibaev, S. G. Surmach, E. E. Tkachenko, O. P. Val'chuk, B. A. Voronov. ■ **SINGAPORE** The Nature Society (Singapore) (BirdLife Partner); Lim Kim Seng ■ **SRI LANKA** Field Ornithology Group of Sri Lanka (BirdLife Affiliate); S. Kotagama; S. Aryaprema, S. Corea, J. P. G. Jones, U. Fernando, R. Perera, M. Siriwardhane, K. Weerakoon ■ **THAILAND** Bird Conservation Society of Thailand (BirdLife Partner); U. Treesucon; R. Jugmongkol, V. Kongthong, P. Poonswad, P. D. Round, S. Supparatvirkorn ■ **VIETNAM** BirdLife International Vietnam Country Programme; Nguyen Cu; J. C. Eames, A. W. Tordoff, Le Trong Trai, Nguyen Duc Tu.

With contributions from: S. H. M. Butchart, D. S. Butler (maps), P. Davidson, J. C. Lowen, G. C. L. Dutson, N. B. Peet, T. Vetta (maps), J. M. Villasper (maps), M. G. Wilson

Recommended citation

BirdLife International (2001) *Threatened birds of Asia: the BirdLife International Red Data Book*. Cambridge, UK: BirdLife International.

© 2001 BirdLife International

Wellbrook Court, Girton Road, Cambridge, CB3 0NA, United Kingdom

Tel: +44 1223 277318 Fax: +44 1223 277200 Email: birdlife@birdlife.org.uk

Internet: www.birdlife.net

BirdLife International is a UK-registered charity

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrical, chemical, mechanical, optical, photocopying, recording or otherwise, without prior permission of the publisher.

ISBN 0 946888 42 6 (Part A)

ISBN 0 946888 43 4 (Part B)

ISBN 0 946888 44 2 (Set)

British Library-in-Publication Data

A catalogue record for this book is available from the British Library

First published 2001 by BirdLife International

Designed and produced by the **Nature**Bureau, 36 Kingfisher Court, Hambridge Road, Newbury, Berkshire RG14 5SJ, United Kingdom

Available from the Natural History Book Service Ltd, 2–3 Wills Road, Totnes, Devon TQ9 5XN, UK. Tel: +44 1803 865913 Fax: +44 1803 865280 Email nhbs@nhbs.co.uk
Internet: www.nhbs.com/services/birdlife.html

The presentation of material in this book and the geographical designations employed do not imply the expression of any opinion whatsoever on the part of BirdLife International concerning the legal status of any country, territory or area, or concerning the delimitation of its frontiers or boundaries.

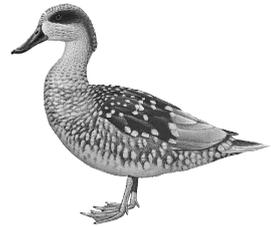
MARBLED TEAL

Marmaronetta angustirostris

Critical —

Endangered —

Vulnerable A1c,d; A2c,d; C1



This species appears to have suffered a rapid decline, evidenced in its core wintering range, as a result of widespread and extensive habitat destruction. It therefore qualifies as Vulnerable. However, data are scarce and some birds may have relocated to alternative wintering sites. Apparent increases in the western Mediterranean population probably reflect improved observer coverage rather than genuine changes. This population has suffered a long-term decline and widespread loss of habitat.

DISTRIBUTION The Marbled Teal has a fragmented distribution around the Mediterranean, through the Middle East and in west-central Asia.

Outside the Asian region In the western Mediterranean it breeds in Spain, Morocco, Algeria and Tunisia, wintering in North and West Africa, and in the eastern Mediterranean it breeds in Turkey, Israel, Jordan and Syria, wintering south to Egypt. Birds in western and southern Asia breed in Armenia, Azerbaijan, a small area of adjacent southern Russia, south-west Turkmenistan, Uzbekistan and southern Kazakhstan in the regions of the Amu Darya and Syrdar'ya rivers (although said now to be absent from the Syrdar'ya river basin in Uzbekistan: Kreuzberg-Mukhina *et al.* 2000), Tajikistan, the marshes of south-east Iraq, south-west Iran and Afghanistan, and winter in the breeding areas south of the Caspian (in south-west Iran more extensively than for breeding) (del Hoyo *et al.* 1992, Green 1996, Porter *et al.* 1996, BirdLife International 2000). In recent times, the bulk of the world population probably bred in the huge and little known Iraqi marshes (Green 1993c, 1996). In Afghanistan the species was "very common" around Kuhak, Seistan (very close to Pakistan), where two men shot 80 within 7 km of Kuhak in 16 days, April 1904, and a female in May was found to contain eggs close to laying (Cumming 1905); populations probably still exist for example at Darqad in the north on the Amu Darya and on Hamun-i-Puzak in Seistan (Evans 1994).

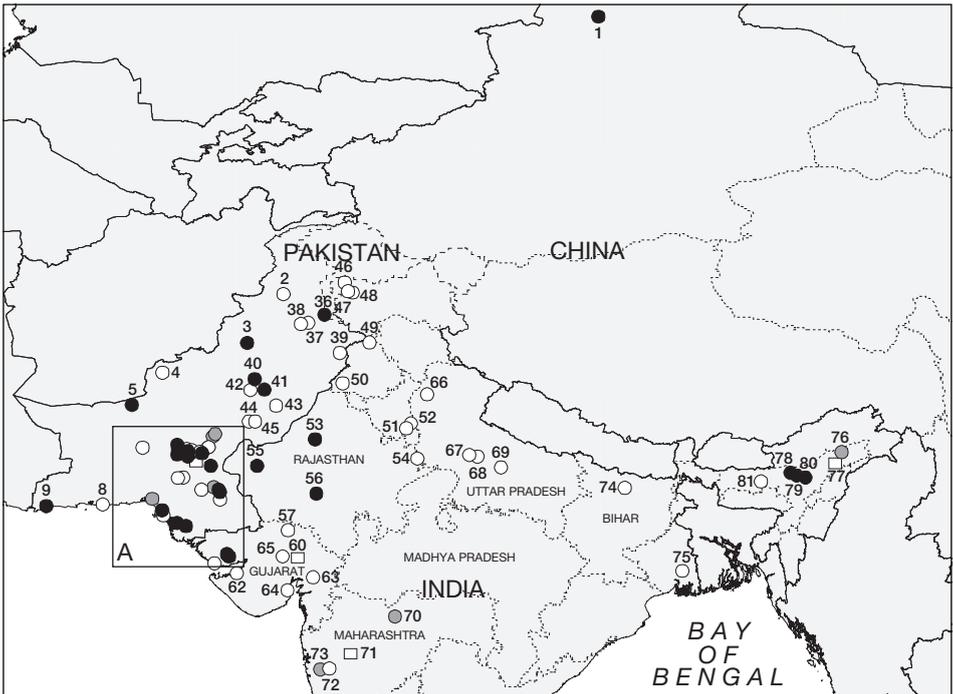
Asian region The species is generally rare and local, with small numbers breeding and wintering in (chiefly southern) Pakistan, wintering in north-west India (with a few records from Assam and a report from Bangladesh: see Remarks 1), and one Chinese record of possible breeding in the far north-west near Kazakhstan.

■ **CHINA** There is a single record, as follows:

■ **Xinjiang Karamay** oilfield, seven or eight seen at an artificial, brackish lagoon near a power station in June 1985, when a male was seen head-bobbing and making occasional short rushes at two females, suggesting possible breeding (Harvey 1986).

■ **PAKISTAN** The species is now a local and rare breeder and winter visitor to Baluchistan and Sind provinces, seen chiefly as a rare passage migrant and winter visitor in Karachi and lower Sind regions (Roberts *et al.* 1986, Grimmett *et al.* 1998). There has apparently been a decline in the wintering population and a contraction in range since the nineteenth century (Green 1993c). Records are from: ■ **North-West Frontier Province Nowshera**, Peshawar, "about 17 km west of the Cantonment on a small jheel near the Kabul river", one female, October 1914 (Home 1915; also Briggs and Osmaston 1928); ■ **Dera Ismail Khan district**, 12, January 1990 (Green 1993c), and at Bridge lake, five sightings of 1–3, 11 February–12 April, 1989–1998 (Kylänpää 2000); ■ **Baluchistan Khushdil Khan lake** (Kush Dil Khan), Pishin district, 1,500 m, two, February 1903 (Marshall 1903), several adults and a brood of 14

juveniles, August 1913 (Aitken 1914), six pairs in June–July 1914 (Meinertzhagen 1920), several, undated (Hickie 1935), four, July (Savage 1968), undated (Ahmed 1989); **Zangi Nawar lake**, chiefly a winter visitor, but “several pairs” nesting, around 1940 (Christison 1941, 1942), 30, February and May 1983 (Ahmed 1983), 300, January 1984, still present with many nesting, May 1984 (Roberts 1985a, 1991–1992), 130, July 1987 (Scott 1989); **Nal** (The Nall), undated (Baker 1921); **Siranda lake** and Sonmiani lagoon, Lasbela, 1–2 pairs, 1915, and a clutch of eight eggs, June 1915 (Ludlow 1916, Baker 1921), at least 12 nests, 1916 (Ludlow 1916, Baker 1921), July 1918 (specimen in BMNH), 1945 (Eates 1940–1950), one, March 1978 (Roberts 1991–1992); **Mor Pati** (Moorputty), a saltmarsh north of Ormara, clutch of eight eggs, June 1878 (Baker 1908, 1921); **Akara dam**, 50 m, January 1987 (Scott 1989); Lulukdan (untraced), 25 km south-east of Tuftan (in the “zero line” between Pakistan and Iranian territory), over 50, including juveniles, August 1993, over 20 pairs breeding regularly (Khan 1998); ■ **Sind** near **Kandhkot**, 50, February 1973 (Koning and Walmsley 1973); **Ghauspur jheel** (Rup), up to 50, 1973 (Green 1993c), six, November 1979 (Roberts 1991–1992); **Seer Chandia lakes**, a pair, April 1980 (Green 1993c), 20, January 1992 (Green 1993c); **Rohri district**, “very common”, January 1872 (specimen in BMNH, Hume 1872–1873); **Dost Ali** (Dost Allee, Dast Ali), near Sukkur, January 1872 (two specimens in BMNH, Hume 1872–1873), regular (Ticehurst 1922–1924); **Ghaibi Dero** (Guibee Dehra, Guybee Dehra), Larkhana, January 1872 (Hume 1872–1873, specimen in BMNH), regular (Ticehurst 1922–1924); **Qambar**, December 1909 (specimen in FMNH); **Drigh Lake Wildlife Sanctuary**, 59, midwinter 1991 (Green 1993c); **Larkana**, January 1872 (four specimens in BMNH, Hume 1872–1873, Hume and Marshall 1879–1881), 1914–1917 (Ticehurst 1922–1924), January 1918 (specimen in BMNH); **Lang** (Lungh, Langh), Larkana district, two, February 1973 (Koning and Walmsley 1973), 40, midwinter 1977 (Green 1993c); **Tando Masti Khan**, near Khairpur, “several pairs”, possibly breeding, March 1965 (Holmes and Wright 1968), and 20, October 1989 (*Oriental Bird Club Bull.* 11 [1990]: 40–48);

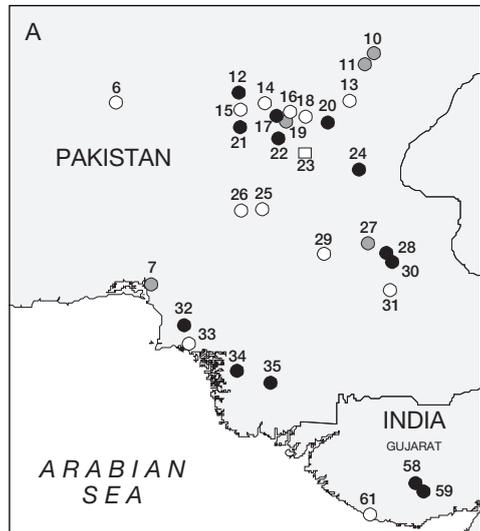


Hamal, Katchri, 29 birds, January 1987 and seven, 1988 (Scott 1989), 1,625, midwinter 1991, and 1,006, midwinter 1992 (Green 1993c) and Hamal (Hummul), Mehur, January 1872 (eight specimens in BMNH, Hume 1872–1873), regular (Ticehurst 1922–1924); **Pugri**, 41, January 1988 (Scott 1989), 10, midwinter 1988 (Green 1993c); **Akri lake** (Akri dhand), Nawab Shah district, 12, February (Ahmed 1983); **Khairpur district**, pre-1969, April 1980 (Roberts 1991–1992); **Sehwan**, “The Gag”, January 1872 (two specimens in BMNH, Hume 1872–1873); **Manchar lake**, Dadu district, 1914–1917 (Ticehurst 1922–1924), March 1919 (two specimens in BMNH), January 1921 (specimen in BMNH); **Sunari lake** (Soonari), Sanghar district, 60 m, seven, winter 1974 (Koning and Koning-Raat 1975), and 20, January 1975 (Scott 1989); **Khar Roo lake**, 20, January 1991 (Green 1993c); **Shahdadpur**, Sind, November 1918 (specimen in BMNH); Loonkhann, near **Khipro**, 23, midwinter 1991, 13 in midwinter 1992 (Green 1993c); **Pithoro** (Pithoro jheels), Eastern Narra, 1914–1917 (Ticehurst 1922–1924); **Hab dam** (Hub Dam), two, October 1992 (Green 1993c); **Karachi**, September 1877 (specimen in BMNH, Hume and Marshall 1879–1881), August 1918 (specimen in BMNH), odd birds on passage every August (Ticehurst 1922–1924); **Mirpur Sakro**, Thatta district, two, October 1981 (Roberts 1991–1992); **Mahboub Shah lake** (Mehboub Shaw lake), Nawabshah district, 15 pairs, May 1992 (Green 1993c); ■ **Punjab Mangla reservoir**, 60 birds, February 1982 (Green 1993c); **Jhelum district**, single individuals, 1918 and 1921 (Wright and Dewar 1925); **Kallar Kahar**, single birds, November 1918, 1921 and 1922 and two birds in 1925 (Waite 1922, 1948); Sheikopura, near **Lahore**, one, March 1923 (Wright and Dewar 1925); **Taunsa barrage**, 150 m, 20 in 1981, 30 (on passage), September 1985 and five in January 1987 (Scott 1989); Rangala, a wetland about 7–8 km from **Muzaffargarh**, 13 pairs (27), May and July 1993 (Anon. 1993d); southern **Dera Ghazi Khan district**, undated (Hume and Marshall 1879–1881); in the **Bahawalpur** region, undated (Hume and Marshall 1879–1881), 33 shot, 1921–1925 (Wright and Dewar 1925); **Jajjah-Abbasian**, Bahawalpur, two, January 1939 (Ali 1941), and up to two, 1960s (Green

The distribution of Marbled Teal *Marmaronetta angustirostris* (main map opposite):

(1) Karamay; (2) Nowshera; (3) Dera Ismail Khan district; (4) Khushdil Khan lake; (5) Zangi Nawar lake; (6) Nal; (7) Siranda lake; (8) Mor Pati; (9) Akara dam; (10) Kandhkot; (11) Ghauspur jheel; (12) Seer Chandia lakes; (13) Rohri district; (14) Dost Ali; (15) Ghaibi Dero; (16) Qambar; (17) Drigh Lake Wildlife Sanctuary; (18) Larkana; (19) Lang; (20) Tando Masti Khan; (21) Hamal; (22) Pugri; (23) Akri lake; (24) Khairpur district; (25) Sehwan; (26) Manchar lake; (27) Sunari lake; (28) Khar Roo lake; (29) Shahdadpur; (30) Khipro; (31) Pithoro; (32) Hab dam; (33) Karachi; (34) Mirpur Sakro; (35) Mahboub Shah lake; (36) Mangla reservoir; (37) Jhelum district; (38) Kallar Kahar; (39) Lahore; (40) Taunsa barrage; (41) Muzaffargarh; (42) Dera Ghazi Khan district; (43) Bahawalpur; (44) Jajjah-Abbasian; (45) Firoza; (46) Wular lake; (47) Mirgund jheel; (48) Srinagar; (49) Gurdaspur; (50) Firozpur district; (51) Gurgaon; (52) Delhi; (53) Bikaner; (54) Keoladeo National Park; (55) Jaisalmer; (56) Pali; (57) Deesa; (58) Devisar tank; (59) Chhari-Dhand; (60) Ahmedabad; (61) Bada tank; (62) Jamnagar; (63) Vadodara; (64) Bhavnagar; (65) Nal lake; (66) Roorkee; (67) Fatehgarh; (68) Sandi; (69) Lucknow; (70) Khamgaon; (71) Ahmednagar; (72) Pune; (73) Mulshi lake; (74) Darbhanga district; (75) Calcutta; (76) Dibrugarh; (77) Sibsagar; (78) Tezpur; (79) Kaziranga National Park; (80) Samaguri beel; (81) Gauhati.

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



1993c, T. J. Roberts verbally 1997); **Firoza**, Bahawalpur, undated (McLeod 1881); Allahno Wari (untraced), 33, January 1992 (Green 1993c); Bolahi (untraced), 32, January 1991 (Green 1993c); Karud Wah (untraced), 13, January 1992 (Green 1993c); Morakho (untraced), 35, January 1991 (Green 1993c).

■ **INDIA** The species is a rare winter visitor (Grimmett *et al.* 1998), with most records, as might be expected, from the north-west of the country. Although there are now several reports from Assam, “the occurrence of this duck so far east is nevertheless astonishing” (Savage and Mackenzie in Isakov 1970). Proper descriptive or photographic documentation is desirable from this region. Records are from:

■ **Jammu and Kashmir Wular lake**, April 1923 (specimen in BMNH); **Mirgund jheel**, near Hokasai, 1,700 m, December 1935 (specimen in BMNH); **Srinagar**, October 1913 (specimen in BMNH);

■ **Punjab Gurdaspur**, undated (McLeod 1881); **Firozpur district** (Ferozepore), singles at Kokala and Alipur, November 1908 and February 1909 (Waite 1922; Whistler ms);

■ **Haryana Gurgaon**, April 1881 (specimen in BMNH, *Stray Feathers* 10 [1881]: 174);

■ **Delhi** Horseshoe jheel, near **Delhi**, one, January 1947 (Benthall 1949);

■ **Rajasthan** Talwhara jheel, near **Bikaner**, Hanumangarh, December 1933 (specimen in BMNH), and in this area at Mohangarh, RD 1440 on the Rajasthan canal (Indira Ghandi canal), one, February 1994 (Sangha 1994); **Keoladeo National Park**, Bharatpur, one, early 1909 (Impey 1909); near **Jaisalmer**, at RD 1333 on the Rajasthan canal, three, and another single near Mohangarh, February 1994 (Sangha 1994); Lakhotia wetland, **Pali**, two, February 1991 (Tiwari 1991);

■ **Gujarat** unspecified localities, undated (Java 1991); northern regions, 1863 (*sic*; presumably 1873) (Hume 1879a); **Deesa** (Disa), undated (Butler 1875–1877); **Devisar tank**, 5–6, January 1993 (Himmatsinhiji 1997); **Chhari-Dhand**, Kutch, 200, February 1990 (Akhtar *et al.* 1992, Tiwari 1997); **Ahmedabad**, undated (Ali and Ripley 1968–1998); **Bada tank**, one, 1940 (Himmatsinhiji 1997); Balambha, 58 km north-east of **Jamnagar**, December 1918 (Berthon 1919); **Vadodara** (= Baroda), three, November 1911 (Burton 1912); **Bhavnagar**, Kutch, undated (Ali and Ripley 1968–1998), this perhaps being the report from Kutch, 1940, by Ali (1945); **Nal lake** (“the Null”), one, December 1899 (Berthon 1919);

■ **Uttar Pradesh** Corbett National Park (unconfirmed), “rare winter visitor”, undated (Lamba 1987); **Roorkee**, 1892–1905 (Cunningham 1928); **Fatehgarh** (Futtehgurh), two, January 1874 or 1875 (Anderson 1875a); **Sandi** (Sandee), at least three, March 1874 or 1875 (Anderson 1875a); **Lucknow**, undated (Reid 1886, 1887, Jesse 1902–1903);

■ **Maharashtra Khamgaon**, December 1967 (Mahabal and Lamba 1987); **Ahmednagar**, listed (Ali and Ripley 1968–1998), presumably on the basis of one at Kapurwaddi tank, January 1947 (Abdulali and Shekar 1966), and another near Ahmednagar, undated (*Newsletter for Birdwatchers* 13, 3 [1973]: 9); Ravengaon lake, c.75 km south-west of **Pune** (Poona), one, December 1934 (Hickie 1935), presumably the undated record listed for Pune by Ali and Ripley (1968–1998); **Mulshi lake**, November 1965 and January 1968 (Mahabal and Lamba 1987);

■ **Bihar** Baghownie factory, Laheria Serai, **Darbhanga district**, undated (Inglis 1908);

■ **West Bengal Calcutta**, 35 km to the south-west, December 1878 (specimen in BMNH, Hume 1879a), and 29 km to the west, one, February 1879 (*Stray Feathers* 7 [1879]: 523, Hume and Marshall 1879–1881);

■ **Assam Dibrugarh**, at the rivermouth, one shot, November 1957 (Savage and Mackenzie in Isakov 1970); **Sibsagar**, undated (Ali and Ripley 1968–1998); **Tezpur**, under the Kalia Bhomora bridge, c.1994 (B. Talukdar in Singha 1996); **Kaziranga National Park**, one at Rongamotia beel, undated (Bhattacharjee *et al.* 1996, Singha 1996, Choudhury 2000c); **Samaguri beel**, Nagaon (Nowgong) district, 1–2, January 1996 (Singha 1996; but see Remarks 2), and also Jalah, near Nagaon town, 1996 (Choudhury 2000c); **Gauhati**, two, undated (Baker 1908);

Bordoibam-Bilmukh Wildlife Sanctuary (not mapped), one, January 1999 (Choudhury 2000c); Dhir beel, Dhubri district (not mapped), four, January 1989 (Choudhury 2000c); Laokhowa Wildlife Sanctuary (not mapped), one at Saralani beel, March 1996 (Choudhury 2000c).

Unconfirmed records include: Madhubani, Darbhanga district, Bihar, one probable sighting, undated (Inglis 1901–1904); Kulu district, Himachal Pradesh, listed by C. H. Donald without any supporting evidence (in Whistler 1926b).

POPULATION Prior to 1991, the estimated world population of the Marbled Teal was 34,000–40,000 birds (Green 1996). Although count data are poor, a more recent estimate of 14,000–24,000 birds indicates a rapid population decline (Rose and Scott 1997). Numbers wintering in Iran fell from 25,000–30,000 (1985–1992) to 5,021 in 1993 and 3,677 in 1995 (Delany *et al.* 1999). The “west Mediterranean” wintering population (apparently excluding Tunisia) was estimated at around 3,000 birds in 1997 (Green and El Hamzaoui 1998), while a recent count of 4,250 on one lake in Tunisia in 1999 raises the known population of the region (Bos *et al.* 2000).

Populations immediately adjacent to the “Asian” region are probably also significant. In the 1908–1909 winter the species was “very numerous” in the Seistan swamps, now in east Iran and south-west Afghanistan (Kinnear 1910). Numbers in this area today are not known. In Afghanistan, the presumed breeding population on Hamun-i-Puzak may still amount to several hundred pairs (Evans 1994). Some data for Uzbekistan are given by Kreuzberg-Mukhina *et al.* (2000): numbers observed in the Amu Darya basin have increased over the last few decades, although the Syrdar’ya basin is apparently no longer a breeding area. Details of the population in the Asian region are given below by country.

Pakistan Over 5,000 were thought to winter in the country a decade ago (Green 1993c). Records reveal that the perceived population declined in the late nineteenth and early twentieth centuries, rising again more recently. It is difficult to be sure how much this is related to fluctuations in environmental factors or in observer coverage.

In Sind in the nineteenth century this duck was described as “singularly abundant in suitable localities” by Hume (1872–1873), and “extremely common” by Hume and Marshall (1879–1881), who asserted that it “invariably associated in large parties”; they described separate individuals “rising every minute” in front of an advancing hunting party, and, although Shovelers *Anas clypeata* and Ferruginous Ducks *Aythya nyroca* were also flushed, “there was not one of these to ten of the Marbled Teal”. In Baluchistan it occurred in smaller numbers: Radcliffe (1915) reckoned it “fairly common” and Marshall (1903) judged it “not common as there were not many at that time” around Quetta. By World War I the species was still “pretty common” in parts of Sind, particularly on Manchar lake, Larkana lakes and in Eastern Narra (Ticehurst 1922–1924). There are no recent records from Manchar lake and none at all from Punjab (Roberts 1991–1992).

Around the middle of the twentieth century, C. D. W. Savage (in Isakov 1970), who found small numbers in suitable weed-covered jheels in Sind, considered the species very uncommon and concluded that numbers had been much reduced in the 50 years before his surveys. In 34 years spent in Pakistan prior to the 1990s, Roberts (1991–1992) encountered it on only four occasions, and thought it “one of Pakistan’s rarest ducks”. Nevertheless, while before 1989, all twentieth-century records of the species in the country were of small groups with no counts of over 100 individuals, since 1990 there have been remarkable counts of over 1,000 from Sunari lake, Hamal Katchri and Badam, with a total count of 5,463 individuals in 1992 (Green 1993c). These increased counts are probably not a true reflection of population trends but rather a function of the number of wetlands surveyed. Available information also indicates that the distribution patterns of the species within Pakistan may have changed over the years. For example, it was formerly recorded at Manchar lake (Ticehurst 1922–1924, Ali and Ripley 1968–1998), but despite four IWRB surveys of this site (Savage 1965b, 1968,

C. D. W. Savage in Isakov 1970) and numerous visits by other ornithologists during the 1960s and 1970s (e.g. Holmes and Wright 1968–1969, Roberts 1991–1992), there have been no recent sightings there. The recent records of its increased numbers may also be due to a shift in wintering range (Green 1993c).

The current status and distribution of the species in Pakistan is still somewhat uncertain, particularly in Sind; several wetland complexes along the Indus have never been thoroughly counted for waterfowl (Green 1993c). Further, there are hundreds of relatively unexplored wetlands along the Thar desert border and to the east of the Eastern Narra canal in Thatta and Badin districts which may contain additional wintering or breeding sites, and the wintering population could be significantly higher than the 5,463 birds seen in 1992 (Green 1993c).

Even less certain information is available on the breeding population in Pakistan, but it is presumably small, with some wintering birds staying to breed in scattered localities (Roberts 1991–1992). There is no evidence that the species was ever a widespread breeder in the country (Green 1993c), and in the 1970s it was thought extinct as a breeding bird until a population of 30 individuals was rediscovered at Zangi Nawar in upland Baluchistan, close to the border with Afghanistan (Ahmed 1983). This is the only site where breeding is known to occur regularly (Green 1993c), and a count of 150 breeding pairs in May 1984 is the maximum recorded there (Roberts 1985a). However, Roberts (1991–1992) believed that Zangi Nawar supports only a nomadic population that sometimes breeds.

It has been found to breed in the provinces of Baluchistan (see, e.g., Aitken 1914, Ludlow 1916, Baker 1921, Roberts 1985a, 1991–1992, Khan 1998), and Sind (Holmes and Wright 1968–1969, Green 1993c). However, the sighting of 13 pairs at Rangala near Muzaffargarh in May and July 1993 indicates that it may also breed in Punjab or “Azad Kashmir” (Anon. 1993d). Direct breeding records include a duck with 14 ducklings observed at Kushdil Khan lake in August 1913 (Aitken 1914), and birds with young near Nawabshah on the left bank of Nara Chotiari in 1995 (T. J. Roberts verbally 1997).

India In Kashmir, Osmaston (1927) judged the bird to be “rather a rare winter visitor” on the basis of seeing only two birds shot in three years, and there have been no recent records from the area (Savage and Abdulali in Isakov 1970). In northern Gujarat, the species was far from common, but occurred on many wetlands in the region (Butler 1875–1877, Barnes 1885), and still occasionally appears in winter (see Distribution). It was thought to be an “exceedingly rare” winter visitor to the Lucknow region, Uttar Pradesh (Reid 1887). In western and central India the species is an accidental vagrant while it is “very uncommon” in northern India (Savage and Abdulali in Isakov 1970). Given the rarity of the species in Uttar Pradesh and Bihar, it seems incredible that it should turn up with some regularity further east. Several early specimens were captured close to Calcutta and sold at Calcutta market (Hume 1879, *Stray Feathers* 7 [1879]: 523, Hume and Marshall 1879–1881), suggesting that, on occasion, “a considerable number must have visited Lower Bengal” (*Stray Feathers* 7 [1879]: 523). Fooks (1947) later mentioned that “comparative rarities” such as “Marbled Duck might be picked up for a few shillings” at Calcutta market between 1925 and 1947, although the provenance of these birds was not made clear. However, repeated recent records from Assam (see Distribution) have led to the conclusion that the species is still a “winter straggler” to north-eastern India (Choudhury 2000c).

ECOLOGY Accounts of ecology in the western portion of the range appear elsewhere (see, e.g., Cramp and Simmons 1977, Green 1998a,c, A. J. Green in Kear in prep.).

Habitat The Marbled Teal is adapted to seasonal or otherwise temporary wetlands, favouring shallow brackish waters rich in emergent and submergent vegetation (Green 1993c, 1996, A. J. Green in Kear in prep.). Fresh or saline wetlands are used, but there is some evidence for a preference for slightly brackish sites (Green 1996). More permanent wetlands seem to be favoured for breeding, while newly flooded areas seem to be preferred outside the

breeding season (Green 1996). It mainly prefers waterbodies with plenty of cover in the form of reeds or inundated tamarisk *Tamarix* bushes, and avoids open water (Ahmed and Ghalib 1986, Roberts 1991–1992). Hume and Marshall (1879–1881) found it mainly in wetlands “thickly grown with rush”; in Sind, Pakistan, “meadow-like broads” densely packed with a species of metre-high rush were its “special haunt” (Hume 1872–1873). It appears to have a preference for small pools (e.g. reed-fringed ponds), is tolerant of alkaline lakes and will also frequent small, drying brackish pools (Roberts 1991–1992). Reed *Phragmites*, glasswort (e.g. *Salicornia*) or *Typha* are typically dominant in the wetlands it favours, especially when they offer densely vegetated shallow areas that provide good cover (Green 1993c). The species also frequents seasonal wetlands (Roberts 1991–1992) and those that flood only in years of high rainfall (Green 1996). Some such sites are man-made, e.g. the Mahboub Shah lake is fed by seepage from the Rohri Irrigation canal (Green 1993c). The single Chinese record is from a desert region with sparse tamarisk scrub, where spillage from the water pipeline was responsible for a 1-km² shallow lagoon, extensively fringed with *Phragmites* reedswamp and *Salicornia* flats (Harvey 1986). The Marbled Teal is a shy, almost silent duck that usually lives in pairs or small parties (Ahmed and Ghalib 1986), although Hume and Marshall (1879–1881) described it, somewhat curiously, as “invariably associated in large parties”, albeit scattered after disturbance. Large monospecific flocks are quite often formed in the post-breeding season and in winter; at dusk such flocks often fly from daytime roosts (with dense emergent vegetation) to more exposed, shallow feeding sites (A. J. Green in Kear in prep.).

Food The species feeds by dabbling, mainly in the top 20 cm of the water layer and, in autumn and winter, chiefly at night (A. J. Green in Kear in prep.). It is practically omnivorous (Baker 1908). Dietary data indicate that it takes a mixture of invertebrates (annelid worms, molluscs, aquatic insects and their larvae) and plant material such as seeds, shoots, leaves, roots and tubers of water weeds (Hume and Marshall 1879–1881, Dement’ev and Gladkov 1951–1954, Ali and Ripley 1968–1998, Roberts 1991–1992, Green 1996). At Zangi Nawar lake, birds were observed upending in water 1.5 m deep, probably feeding on the water weed *Ruppia maritima* (Roberts 1991–1992). The species appears to take submerged macrophytes when available, but is not known to feed on plankton (Green 1996). In India it has mainly been recorded as vegetarian, feeding on seeds and shoots of aquatic plants (Ali and Ripley 1968–1998). A captive group kept by Roberts (1991–1992) survived on a mixture of cereal, millet and sorghum seeds thrown into the water with pieces of dried fishmeal. One of Baker’s (1908) correspondents thought he remembered finding a frog in the stomach of a specimen; if so, it would have been a very small one.

Breeding Season This duck is sexually monomorphic and monogamous (Roberts 1991–1992). In Pakistan courting and pair-formation have been observed between April and May, while nesting itself is apparently variable in timing, generally falling between late April and the first half of July (Roberts 1991–1992). In Uzbekistan, nesting is recorded from May to August, most broods appearing in the second half of June (Kreuzberg-Mukhina *et al.* 2000).

Nest site and structure The nest is made of rushes and weeds, usually concealed inside a clump of aquatic vegetation with an entrance tunnel roofed over by grasses (Ludlow 1916). At Zangi Nawar lake, nests are apparently usually sited in dense clumps of *Phragmites* (Roberts 1991–1992). They have also been found in a stand of *Typha* at Mahboub Shah lake (Green 1993c), in a “*Juncus* sedge clump” (note that *Juncus* is a rush) at Siranda jheel (Green 1993c) and on small marshy or dry islands (Aitken 1914, Green 1993c). It occasionally nests some distance from water, but always in sheltered situations (Ahmed and Ghalib 1986). The nest itself is usually unlined, but sometimes lined with down (Roberts 1991–1992).

Clutch and incubation Clutches of 4–14 eggs have been reported (Roberts 1991–1992), also of 8–12 eggs (Baker 1921, Ali and Ripley 1968–1998); two nests reported by Ludlow (1916) contained nine and 12 eggs, and one in the Seistan swamps, Iran/Afghanistan, May 1905, held 16 eggs (Cumming 1905). A brood encountered at Kushdil Khan lake in 1913

comprised 14 juveniles (Roberts 1991–1992), although broods will merge, and up to 32 ducklings have been seen with one female (Green 1996). In captivity, incubation takes 25–27 days and the ducklings, which hatch synchronously, are able to feed themselves from the outset; care of the young after hatching appears to be entirely by the female (Roberts 1991–1992).

Migration Across the breeding range, populations evidently vary from being more or less resident to being short- or medium-distance migrants (e.g. Cramp and Simmons 1977), with birds in the southern part of the world distribution—Mali, Chad, Nigeria, Lebanon and India—present there only in winter or as non-breeders (Green 1996). There is a variable, near-nomadic migration strategy, and birds are capable of dispersal movements in search of suitable habitat, partly in response to annual variations in rainfall; as a consequence, large local population fluctuations occur (Green 1996). Thus, the small population wintering in the Indus plains is considered probably nomadic by Scott (1989). Autumn movement through the Turkmenistan region occurs from late September to November, with a return passage in April and early May (Dement'ev and Gladkov 1951–1954), and in Uzbekistan until the second half of October in autumn and from mid-April to the end of May in spring (Kreuzberg-Mukhina *et al.* 2000). Autumn arrival in India, even in the far north-west, is apparently later than in most other ducks (Baker 1908).

THREATS Although the bulk of the Marbled Teal's population is centred in and around the Middle East, it is undergoing a rapid decline throughout its range, the most important causes of this being destruction of habitat and hunting. In Europe, North Africa, the Middle East and Central Asia, over 50% of suitable habitat, i.e. chiefly seasonal wetlands, may have been destroyed during the twentieth century, and the species is not well adapted to exploit the permanent wetlands (e.g. reservoirs) that may replace them (Green 1993c, 1996, 2000). Drainage for agriculture and other purposes occurs across its range, most significantly in the formerly huge marshes of south-east Iraq, and hydrological work has severely affected breeding sites in Tunisia, Turkey, Morocco and Spain (Green 1996). Reed-cutting, reed-burning and grazing commonly reduce the amount of habitat available for nesting, and pollution from agricultural, industrial and domestic sources is a threat at many sites (Green 1996). During the breeding season the species is vulnerable to shooting and egg collection, and further mortality results from birds caught in nets and lead poisoning (Green 1996). Details of the threats that this species faces in Asia are given below. Further details of threats to wildfowl in Pakistan appear in the equivalent section under White-headed Duck *Oxyura leucocephala*.

Habitat loss and modification Pakistan Most sites have been affected during the twentieth century by widespread irrigation and drainage schemes associated with agricultural development (Green 1993c). Reduced water levels, owing to the diversion of streams for irrigation, threaten Zangi Nawar lake and a number of wintering sites such as Drigh and Lugh lakes in Sind (Green 1993c). A similar process has degraded Siranda jheel, and may have caused the disappearances of the species from this former breeding site (Scott 1989). Its disappearance from Manchar lake in Sind since World War I (see Population) may have resulted from the construction of Guddu barrage on the Indus in 1962, which delayed the timing of flooding into the lake, markedly changing the ecology of the site (Green 1993c). A number of sites are threatened with possible future drainage for agriculture, such as Pugri and Sunari lake in Sind (Scott 1989). In contrast, large areas of new wetlands have been created by irrigation activities, particularly in Sind; there are numerous new barrages, wetlands created by seepage from drainage canals, and many others created at the mouths of outfall drains in the inner delta, and some of these new wetlands may now be of great importance to the species (Green 1993c; see Threats under Jerdon's Babbler *Chrysomma altirostre*). However, the diversion of the winter flow from rivers for the purpose of irrigation, as a result of engineering works on the Indus and its tributaries in the last several decades, seems to have caused fundamental changes in the distribution of wildfowl; moreover, owing to the increasing

human population, many areas previously favoured by wildfowl are no longer available (C. D. W. Savage in Isakov 1970). At Lulukdan, Baluchistan, threats include the cutting of tamarisk and reed, and overgrazing (Khan 1998). Stocking of wetlands in Pakistan (e.g. Khabbaki lake) with herbivorous fish is thought to have contributed to the reduction in wildfowl populations through direct competition for resources (Scott 1989).

A number of sites currently or formerly occupied by the species (Manchar, Hamal Katchri, Pugri, Drigh, Lungh and Ghauspur) lie on the right (west) bank of the Indus which is currently the subject of the as yet not fully accepted Right Bank Management Plan (RBMP), which will attempt to address the problems of salinity and waterlogging of agricultural land (evidently good for the teal) caused by irrigation (Ahmed *et al.* in press). The loss of Marbled Teal from the former breeding site of Kushdil Khan lake may be associated with the degradation of this site by siltation and increased human disturbance (Scott 1989). Heavy grazing, burning of vegetation and disturbance from fishing are among the other threats to sites of current importance for the species (Green 1993c). Breeding at preferred wetlands may be abandoned in unfavourable conditions, such as when water is scarce, as at Siranda jheel (Roberts 1991–1992), or in years of drought, as at Zangi Nawar lake in 1985–1986 (Scott 1989). Reed-cutting, reed-burning and overgrazing are commonplace and reduce the amount of habitat available for nesting (Green 1996).

Persecution Intensive hunting in northern India and Pakistan has presumably contributed to the decline in those regions. With the increasing human population, hunting pressure has been extreme, at least in Pakistan, and overall wildfowl numbers have fallen dramatically as a result (Scott 1989, Roberts 1991–1992). The Marbled Teal is considered a relatively tame duck that is easy to shoot, particularly in the breeding season (Phillips 1922–1923, Green 1993c), and few hunters are even aware of its threatened status (Green 1993c). In Pakistan, there is heavy human exploitation of this duck where it breeds, and collection of its eggs is probably widespread (Ludlow 1916, Green 1993c). Continued and increasing levels of hunting and egg collection are identified as threats to the population breeding at Lulukdan in Baluchistan (Khan 1998). At Zangi Nawar, a female and a clutch were taken in May 1983 (Ahmed 1983). Ticehurst (1926–1927) and Christison (1942) reported local hunters collecting Marbled Teal eggs at Siranda jheel and Zangi Nawar lake respectively, where hunting of the species also takes place (Ahmed 1989). It is likely that hunting is the primary threat at Kushdil Khan lake, as it is the main shooting area for army personnel and in winter suffers from severe hunting which the civilian authorities are unable to control (T. J. Roberts *in litt.* 1997). As an indication of the threat faced by migratory ducks in Pakistan, Ahmad and Saeed-Uz-Zaman (1991) mentioned that “waterfowl hunting is a very popular sport in Chitral” (the main migrant flyway in the country), where hunters inhabit every village (1,700 armed hunters estimated in total) and have constructed 770 artificial ponds to attract ducks in this district alone. Many years ago, Ali (1936) commented that “no one who has visited the larger dhands or jheels in Sind and other places in northern India during the cold weather can have failed to remark upon the magnitude of the netting operations that go on throughout this season for supplying the markets of the larger towns, both near and distant, with wildfowl of every description for the table”. Local inhabitants around these lakes apparently subsist largely on duck meat during the winter, or at least did when duck numbers were sufficiently high. At Manchar lake alone, the kill was enormous, involving many thousands of birds per year (Elliot 1912, Ali 1936), presumably another factor that has extirpated this species in many areas. In Jammu and Kashmir, India, an estimated 4,000–8,000 geese and ducks are killed each winter, although this is certainly an underestimate because much illegal hunting is conducted (Pandit 1982). Wildfowl populations there undoubtedly suffer from high levels of exploitation, and this, combined with the deterioration of wetland habitats through drainage, siltation and development (Pandit 1982), presumably underlies, at least in part, the fading status of the Marbled Teal.

MEASURES TAKEN The Marbled Teal is listed on Appendix I of the CMS (Bonn Convention, for which see Boere 1991). It is legally protected in Bulgaria, Israel, Morocco, Spain, Russia, Tunisia and Turkey, and there are key sites within protected areas in Azerbaijan, Morocco, Tunisia and Spain (Green 1996). Conservation programmes have been carried out in Spain, survey and research projects have been carried out in Morocco and Turkey (1995–1999), and an international action plan has been published (Green 1996). Conservation measures taken for this species in the “Asian” region are given below.

Legislation The species has been protected by law against hunting/shooting and trapping in Pakistan (Ahmed and Ghalib 1986, Green 1993c). However, these laws are often flaunted and many of the sites important to the species are privately owned, making them difficult to enforce (Green 1993c).

Protected areas Zangi Nawar (11 km²), Drigh (2 km²), Taunsa barrage (65.7 km²) and Lungh (2 km²) are wildlife sanctuaries, while Mangla reservoir is a Ramsar site (Green 1993c). The species also occurs at Bund Khushdil Khan Game Reserve (13 km²). However, protection has not been sufficient to prevent the degradation of these sites. In particular it has failed to prevent the diversion of water from the catchments of these wetlands, leading to reduced water levels (Green 1993c). In India the species has been recorded as a vagrant to Harike Lake Wildlife Sanctuary, Punjab, and to Bordoibam-Bilmukh and Laokhowa Wildlife Sanctuaries in Assam.

Re-introduction In 1972, WWF-Pakistan attempted to re-introduce 24 Marbled Teals, donated by the Wildfowl (now Wildfowl and Wetland) Trust, at Lal Suhanran National Park near Bahawalpur; however, they were released too soon and killed shortly afterwards by mongooses (Koning and Walmsley 1973, Ahmed 1983, Green 1993c).

MEASURES PROPOSED **Protected areas and habitat management** In Pakistan, Sunari lake, Hamal Katchri, Badam, Mahboub Shah lake, Ghauspur jheel (Rup) and Mangla reservoir should be designated as wildlife sanctuaries, and Zangi Nawar lake and Taunsa barrage as Ramsar sites (Green 1993c). Khan (1998) recommended the establishment of Lulukdan in Baluchistan province as an “international conservation site”. There is a need for the development and implementation of effective management plans at Zangi Nawar, Sunari, Hamal Katchri, Badam, Drigh, Lungh, Taunsa barrage, and Lulukdan, and the diversion of water away from Drigh and Zangi Nawar lakes should be prevented (Green 1993c, Khan 1998). The most important need is to develop effective conservation management at important sites for the species, paying particular attention to breeding sites (Green 1996).

Research There is a need to locate and survey unknown wetlands within the Indus-irrigated area of Sind, Pakistan, mainly in the Rice Canal Command, and to undertake regular surveys to assess the importance of key sites to the species (Green 1993c). Khan (1998) recommended research to identify sustainable management practices for Lulukdan.

Education Education programmes are needed in the vicinity of key breeding and wintering sites to raise awareness of the rarity of the species and the threats it faces from hunting—and to encourage observance of its status as a protected species. Thus, information boards should be installed at Lulukdan to raise awareness of the importance of the site (Khan 1998).

REMARKS (1) Harvey (1990) suggested that the species was identified in Bangladesh in the early 1980s, but gave no further details; it is considered a possible winter vagrant there by Grimmett *et al.* (1998). No primary records have been traced. (2) The individual photographed at Samaguri beel in Assam associated with Lesser Whistling Duck *Dendrocygna javanica* and was thought by A. Choudhury possibly to be an albino of this species, even after viewing the photographs, and this conclusion “cannot be ruled out” (Singha 1996).