

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

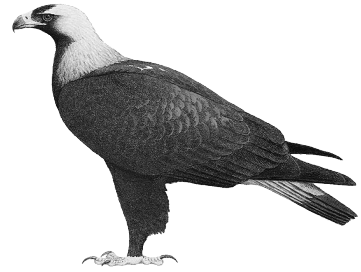
Available from the Natural History Book Service Ltd, 2–3 Wills Road, Totnes, Devon TQ9 5XN, UK. Tel: +44 1803 865913 Fax: +44 1803 865280 Email nhbs@nhbs.co.uk
Internet: www.nhbs.com/services/birdlife.html

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.

IMPERIAL EAGLE

Aquila heliaca

Critical —
Endangered —
Vulnerable C1



It is estimated that this species's small population has declined by more than 10% in three generations, primarily as a result of the loss of mature native forest and persecution in parts of Europe and probably in Asia. This qualifies it as Vulnerable.

DISTRIBUTION The Imperial Eagle occupies a massive range in the Old World, breeding mainly in the Palearctic from Central Europe east to the Russian Far East, and wintering in the Afrotropical and Oriental regions.

Outside the Asian region Outside “Asia” as defined here, the species occupies a fragmented breeding range in Slovakia, Croatia, Yugoslavia, Macedonia, Hungary, Bulgaria, Turkey, Moldova, Ukraine, Russia, Georgia, Iran, Armenia, Azerbaijan, Turkmenistan, Uzbekistan and Kazakhstan; passage or wintering birds from eastern populations occur in the Middle East, east Africa south to Tanzania and the Arabian peninsula, and some European birds winter in Greece and Turkey (Heredia 1996). Just outside the region of coverage, the species was once common throughout the winter at Kandahar, Afghanistan (bordering Baluchistan province, Pakistan) (Swinhoe 1882), while several dark eagles seen near Girishk, slightly to the west, were probably this species (Paludan 1959).

Asian region The species breeds in eastern Russia, northern mainland China and presumably Mongolia, and formerly nested in very small numbers in Pakistan and northern India. It has been recorded as a passage and/or winter visitor (or vagrant) in Japan, North Korea, South Korea, mainland China, Hong Kong, Taiwan, Pakistan, India, Nepal, Bhutan, Bangladesh, Thailand, Laos, Vietnam, Peninsular Malaysia and Singapore. Given nomenclatural and identification difficulties (see Remarks 1), most records and breeding reports merely suspected to involve this species have been omitted. There is a single confirmed record from Myanmar and only one possible record from Indonesia: an immature seen, either this species or Steppe Eagle *Aquila nipalensis*, at Simpangagas river, South Sumatra, in April 1989 (Verheugt *et al.* 1993).

■ **RUSSIA** In eastern Russia, the species breeds in Krasnoyarsk, Khakassia, Irkutsk and Buryatia, and is also recorded from Primorye, with records as follows:

■ **Krasnoyarsk Krasnoyarsk**, undated (Rogacheva 1992); **Minusinsk basin** (Minusinsk depression), a breeding population remaining stable for 30–40 years presumably up to c.1980 (Kustov 1981 in Rogacheva 1992); **Us depression**, occasionally breeding, immature seen, June 1982 (Syroechkovski and Bezborodov 1987 in Rogacheva 1992);

■ **Khakassia Sayano-Shushenskiy Reserve**, occasionally breeding, undated (Sokolov *et al.* 1983 and Petrov and Rudkovskiy 1995 in Rogacheva 1992);

■ **Irkutsk** (on the Priol'khon'ye forest-steppe, Bratsk reservoir forest-steppe, Ol'khon island, Kuda river basin (Ust-Ordynsky forest-steppe) and the Balagansk-Nukutskaya forest-steppe) **Tazheranskaya steppe**, Priol'khon'ye forest-steppe, 5 km east of Elantsy settlement, and in the central part of the steppe 10–20 km south of “MRS settlement”, undated (Ryabtsev 1983, 1995); near **Bratskoye reservoir** (Bratsk reservoir), pairs nested 7 km east of Novo-Lenino settlement on the northern shore of Unginskaya bay of the reservoir, and 10 km from Novo-Lenino, on the road to Balagansk settlement, 1981–1982 (V. V. Ryabtsev *in litt.* 1997); lower reaches of the Anga river, Kachug district, 5 km east of **Kachug** (Katchug)

settlement, one seen, July 1989 (V. V. Ryabtsev *in litt.* 1997); lower Manzurka river, near **Kharbatovo** village, Kachugskiy district, one seen, July 1989 (V. V. Ryabtsev *in litt.* 1997); lower reaches of the **Unga river**, 8 km west of Novonukutsk settlement, five nests found in 20 km² of pine forest near the Khashkay rock in 1964, the nests 1.5–2 km apart (Sonin and Lipin 1980), four pairs nesting, 1981–1982 (the nests 2–5 km apart), three pairs, 1983, two pairs, 1984 (Ryabtsev 1983, 1984c), nest found during a partial survey, 1987 (V. V. Ryabtsev *in litt.* 1997), nest found, 1996 (V. V. Popov *in litt.* 1997); southern bank of the Unginskaya bay in the Bratsk reservoir, 25–35 km north-east of **Nukuty** (Novonukutsk) settlement, two pairs nesting, 1981–1982 (V. V. Ryabtsev *in litt.* 1997); near Pervomaysk, east bank of the Bratsk reservoir (Angara river), **Balagansk**-Nukutskaya forest-steppe, clutches of 1–3 eggs collected annually, April–May 1964–1967 (four clutches in ZMISU, ZMMSU), three pairs nesting, 1979 (nests 2–5 km apart), two pairs nesting, 1981–1983 (Popov 1984, Ryabtsev 1984a, 1989, V. V. Ryabtsev *in litt.* 1997); lower reaches of the **Osa river** and the **Obusa river**, seen, June 1979, July 1986, August 1989 (V. V. Ryabtsev *in litt.* 1997); 5 km south-east of **Khuzhir** settlement, Ol'khon island, undated (Ryabtsev 1985, V. V. Ryabtsev *in litt.* 1997); Ida river, near **Bokhan** settlement, seen, June 1979, August 1989 (V. V. Ryabtsev *in litt.* 1997); 4 km east of **Elga** settlement, Ol'khon island, undated (Ryabtsev 1985, V. V. Ryabtsev *in litt.* 1997); 4 km north of **Sarma** village, Priol'khon'ye forest-steppe, undated (Ryabtsev 1983, 1995); near **Bayanday** settlement, Bayandaevskiy district, singles, July 1982 and August 1996 (V. V. Ryabtsev *in litt.* 1997); Khalzan, 5 km north-east of **Tashkay** village, Ol'khon island, undated (Ryabtsev 1985, V. V. Ryabtsev *in litt.* 1997); 3 km north of **Oloy** village, Ekhirit-Bulagatskiy district, pair seen, July 1996, one seen, August 1996 (V. V. Ryabtsev *in litt.* 1997); near **Olzony** village, Ekhirit-Bulagatskiy district, pair, August 1979 (V. V. Ryabtsev *in litt.* 1997); 3–7 km east of **Kosaya Step'** village, Priol'khon'ye forest-steppe, undated (Ryabtsev 1983, 1995); 4 km north of **Khaday** village, Ol'khon island, undated (Ryabtsev 1985, V. V. Ryabtsev *in litt.* 1997); near **Ust'-Ordynskiy** (Ust'-Orda) settlement, 70 km north-east of Irkutsk by road, pair nesting, 1989–1990, seen, June–July 1993 (V. V. Ryabtsev *in litt.* 1997), seen, May 1996 (V. V. Popov *in litt.* 1997); the lower **Anga river** (draining into Baikal lake), Tazheranskaya steppe, 10 km east of Elantsy settlement, Priol'khon'ye forest-steppe, undated (Ryabtsev 1983, 1995); **Krestovaya** (Krestovskaya pad'), 12–16 km south-east of Petrovo village, Priol'khon'ye forest-steppe, undated (Ryabtsev 1983, 1995); near **Kuda** (Kudareyka) village, Ekhirit-Bulagatskiy district, pair nesting, 1978–1979 (Ryabtsev 1984c), but not present since the mid-1980s (V. D. Sonin *in litt.* 1997); near **Irkutsk**, October 1926 (specimen in ZMISU); Pribaykal'skiy National Park (not mapped, because it includes several of the localities listed above), two juveniles trapped and satellite transmitters attached, summer 1998 (M. J. Ueta *in litt.* 1999);

■ **Buryatia** near **Ulunkhan** (Ulyunkhan) settlement, nest with a chick, August 1992 (V. V. Ryabtsev *in litt.* 1997), two seen, May 1993 (Dorzhiiev 1993); near **Argoda river** (Argada river), 50 km east of Barguzin settlement, two juveniles seen, August 1992 (V. V. Ryabtsev *in litt.* 1997); **Ulan-Burga river**, 70 km east of Barguzin settlement, undated (V. V. Ryabtsev *in litt.* 1997); **Zarmat**, nest found, July 1960 (Gusev 1962), nest with eggs, May 1962 (clutch in ZMMSU); between **Ulan-Ude** and the Mongolian border, two seen, June 1991 (G. Ouweneel *in litt.* 1999); 1.5 km west of **Kyren** settlement, Tunkinskaya valley, Tunkinskiy district, occupied nest found, August 1991 (V. V. Ryabtsev *in litt.* 1997); **Tokhoy lake**, south of Ulan-Ude, two adults and one juvenile seen, June 1991 (G. Ouweneel *in litt.* 1999); **unnamed locality** (at 50°38'N 104°10'E), satellite-tracked juvenile, October 1998 (M. J. Ueta *in litt.* 1999); Ogarnogkhoto (untraced), three eggs collected, April 1966 (clutch in ZMMSU);

■ **Primorye** near **Ussuriysk**, immature shot, January 1976 (Glushchenko *et al.* 1986); **Krabbe peninsula**, Pos'yeta bay (zaliv Pos'yeta), adult, February 1986 (Shibnev and Glushchenko 1988).

■ **MONGOLIA** This species presumably breeds in the steppe and forest-steppe regions of Mongolia, but apart from a single breeding record from Selenge in central-northern Mongolia it is currently known from only a handful of records. Satellite-tracking studies have shown that birds from the eastern Russian population migrate through Mongolia en route to China. Records are as follows: ■ **Khovd Khar Us Nuur** region, Khovd river valley, Mongolian Altay, seen, August–October 1996 (Kováts *et al.* undated); Bulgan-gol, one possible seen, May 1978 (Piechocki *et al.* 1981); ■ **Dzavkhan unnamed locality** (at c.49°N 96°E), one, July 1992 (C. Bealey *in litt.* 1999); ■ **Khövsgöl Selenge river**, Khövsgöl (Hovsgol) province, undated (Fomin and Bold 1991); unspecified locality, Chövsgöl region, one collected “recently” (Sumjaa in Piechocki *et al.* 1981); ■ **Övörkhangaï near Khujirt** (Chudshirt), two, June 1978 (Mauersberger 1979); ■ **Selenge lower Orkhon river** (Orchon river), one possible seen, June 1972 (Mauersberger 1979, also Fomin and Bold 1991), breeding pair with one juvenile, July 1990, the only breeding record for Mongolia so far (Heidecke *et al.* 1992); **unnamed locality** (at 50°01'N 105°15'E), near the border with Russia, satellite-tracked juvenile, October 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 49°25'N 106°35'E), northern Mongolia, satellite-tracked juvenile, October 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 48°55'N 106°39'E), northern Mongolia, satellite-tracked juvenile, October 1998 (M. J. Ueta *in litt.* 1999); ■ **Töv unnamed locality** (at 48°09'N 107°03'E), near Ulaanbaatar, satellite-tracked juvenile, October 1998 (M. J. Ueta *in litt.* 1999); near **Terelja** (Tereldsh), Turtle Rock, one, August 1984 (Kerr-Smiley 1997–1998); **unnamed locality** (at 47°49'N 108°18'E), east of Ulaanbaatar, satellite-tracked juvenile, October 1998 (M. J. Ueta *in litt.* 1999); ■ **Sukhbaatar unnamed locality** (at 46°25'N 111°55'E), eastern Mongolia, satellite-tracked juvenile, October–November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 46°06'N 111°45'E), eastern Mongolia, satellite-tracked juvenile, October–November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 45°56'N 114°20'E), eastern Mongolia, satellite-tracked juvenile, October–November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 44°57'N 113°15'E), eastern Mongolia near border with Inner Mongolia, satellite-tracked juvenile, October–November 1998 (M. J. Ueta *in litt.* 1999); *province unknown* north of Möron (several possible alternatives, and therefore untraced), adult seen, July 1990 (Kalbe 1994).

■ **JAPAN** The Imperial Eagle is a rare winter visitor to Honshu, Shikoku, Kyushu and the Nansei Shoto, with records (by island and prefecture) as follows:

Honshu ■ **Iwate Miyako-shi**, one collected, undated (Austin and Kuroda 1953), immature seen in three consecutive winters, 1984/1985 to 1986/1987 (Morioka *et al.* 1995); ■ **Niigata** unspecified localities, undated (OSJ 2000); ■ **Gifu Ibi-gawa** river, seen, March 1985 (Morioka *et al.* 1995); ■ **Shizuoka Oi-gawa river mouth**, January–February 1969, January 1971 (WBSJ Yacho Kiroku linkai 1986 in Brazil 1991), immature seen in three consecutive winters 1984/1985 to 1986/1987 (Morioka *et al.* 1995); ■ **Hyogo Ichi-gawa** river, seen in six consecutive winters, 1968/1969 to 1973/1974 (Morioka *et al.* 1995); ■ **Tottori** unspecified localities, undated (OSJ 2000); ■ **Shimane Hii-gawa** river, seen, November 1987 (Morioka *et al.* 1995);

Shikoku ■ **Tokushima** Sanakawachi village, unconfirmed record of a juvenile, September 1978 (Morioka *et al.* 1995); ■ **Ehime Matsuyama-shi**, seen, December 1954, the bird being injured in a fight with a Black Kite *Milvus migrans* and kept in captivity until it died in 1957 (Morioka *et al.* 1995);

Kyushu ■ **Fukuoka Kitakyushu-shi**, seen, November 1979 (Morioka *et al.* 1995); ■ **Nagasaki** unspecified localities, undated (OSJ 2000); ■ **Kumamoto Ichinomiya-cho**, Aso-gun, third-year female, January 1975, reported to have been killed by a collision with a train (Morioka *et al.* 1995); ■ **Miyazaki Miyakonojo-shi**, seen, October 1991 (Morioka *et al.* 1995); ■ **Kagoshima Izumi** city, two juveniles seen, late 1978–early 1979, immature, late 1979/1980, juvenile, January–February 1992, seen, late 1993–early 1994 (Morioka *et al.* 1995);

Ishigaki-jima island, unconfirmed record, February 1989 (Morioka *et al.* 1995), one, January 1990 (WBSJ 1990);

Iriomote-jima island, August 1967 (Kuroda 1984 in Brazil 1991), 1969 (Morioka *et al.* 1995).

■ **KOREA** ■ **NORTH KOREA** The species is a scarce winter visitor, with records as follows: ■ **North Hamgyong Yang-do** islands, near Songjin, one seen flying north, March 1953 (Neff 1956); ■ **Kangwon Dongjong lake**, winter visitor (Chong and Morishita 1996); **Tongjong-ho** (Tongchonho) river, juvenile, December 1989 (Fiebig 1993; also Tomek 1999); **Anbyon** field, winter visitor (Chong and Morishita 1996); ■ **South Hwanghai Sahyon-ni** (Sahyon-ri), Pyoksong-gun, one collected, December 1960 (Won 1963); **Chongdan** field, winter visitor (Chong and Morishita 1996); unspecified locality, one collected, February 1916 (Austin 1948, Won 1963).

■ **SOUTH KOREA** The species is a scarce winter visitor, with records as follows: ■ **Kangwon Kyongpo lake**, one, February 1999 (MOE Korea 1999); ■ **Kyonggi and Seoul Han estuary** and Imjin river, one, midwinter 1995/1996 (Pae *et al.* 1995); **Ichon** (Risen), Keiki district, subadult collected, 1913 (N. Kuroda 1918; also Austin 1948, Won 1963); **Shihwa reclamation lake**, 15 seen, February 1999 (MOE Korea 1999); ■ **South Chungchong** unspecified localities, collected, 1912, December 1934 (Austin 1948, Won 1963); ■ **South Kyongsang Nakdong estuary**, one seen at Taema-dung, April 1992–April 1993 (Kim and Won 1997), “vagrant” (Woo *et al.* 1997); ■ **South Cholla Mokpo**, immature collected, May 1916 (N. Kuroda 1918); **Haenam** region, two seen at Dangduri, Yongam lake, winter 1999 (N. Moores *in litt.* 1999), three seen, February 2000 (N. Moores *in litt.* 2000).

■ **CHINA** ■ **MAINLAND CHINA** The Imperial Eagle is an uncommon breeding bird in the north-west and possibly also the north-east, and a scarce passage and winter visitor in the south. It has been reported to be resident in Liaoning (Liu Mingyu *et al.* 1988) and the lower Yangtze valley (Moffett and Gee 1913). Records are from:

■ **Jilin Fusong county**, July 1983 (Liu Mingyu *et al.* 1988); **Changbai Shan** mountains, recorded in the past, but not for at least 20 years (Zhao Zhengjie 1985);

■ **Liaoning Chaoyang**, undated (Cheng Tso-hsin 1987); **Suizhong county**, one collected, November 1985 (Liu Mingyu *et al.* 1988); **Dalian city**, immature female collected, November 1964 (Sun Shide *per* Gao Wei *in litt.* 1997); **Laotie Shan**, Dalian city, one collected, October 1973 (Liu Mingyu *et al.* 1988);

■ **Inner Mongolia Dalai Hu National Nature Reserve**, July 1992 (Carey and Melville 1992), one, May 1995 (Liu Songtao *in litt.* 1998); Bayan Ulan Sum, **Jalaid Qi**, one seen, April 1997 (Liu Bowen *in litt.* 1998); **unnamed locality** (at 43°17'N 112°02'E), near the border with Mongolia, satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 42°37'N 112°02'E), satellite-tracked juvenile, December 1998 (M. J. Ueta *in litt.* 1999);

■ **Xinjiang** in the Tien Shan mountains (Yuan Guoying 1991, Xu Weishu 1995), breeding south of **Hom Hanas Mongolzu Xiang** (= Hanas Hu), two adults seen, August 1989 (Dissing *et al.* 1990); **Altay**, breeding (Zheng Shengwu 1994); **Burqin**, breeding (Zheng Shengwu 1994); **Barkol**, breeding (Zheng Shengwu 1994); **Bayanbulak** presumably in Bayanbulak Nature Reserve, immature seen, August 1989 (Dissing *et al.* 1990);

■ **Qinghai Qinghai Hu** (= Koko Nor) lake, passage migrant or winter visitor (Li Dehao 1989, Zheng Shengwu 1994, Gao Wei *in litt.* 1997), seen, May 1987 (Goodwin 1987), immature seen at Niao Dao, April 1989 (Appleby *et al.* 1989);

■ **Gansu Jiuquan county**, passage migrant and/or winter visitor (Zheng Shengwu 1994); **Subei county**, passage migrant and/or winter visitor (Zheng Shengwu 1994); **Aksay**, passage migrant and/or winter visitor (Zheng Shengwu 1994); **Qilian Shan** mountains, recorded on migration (Zheng Shengwu 1994); **Zhangye county**, passage migrant and/or winter visitor (Zheng Shengwu 1994); Xiyang river, **Sunan county**, October 1982 (immature in LAUCN); **Wuwei county**, passage migrant and/or winter visitor (Zheng Shengwu 1994); Baita Shan and Siping Shan, north of Xujiawan, **Lanzhou city**, each winter 1952–1956, commonly seen scavenging on

offal of slaughtered cattle and sheep at dusk and dawn (Wang Xiangting 1991); **unnamed locality** (at 35°04'N 105°20'E), satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); **Luqu county** (Ma'ng'e), passage migrant and/or winter visitor (Zheng Shengwu 1994); **Maqu** (Nyinma), passage migrant and/or winter visitor (Zheng Shengwu 1994);

■ **Sichuan** near **Zoigê** (Ruo'ergai), immature seen, May 1989 (Clements 1989); **unnamed locality** (at 32°38'N 102°37'E), satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 31°53'N 104°42'E), western edge of the Sichuan basin, satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 30°55'N 104°32'E), north-east of Chengdu city, satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 29°40'N 103°43'E), near Le Shan, satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); **unnamed locality** (at 29°01'N 104°04'E), south-west edge of Sichuan basin, satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999);

■ **Yunnan Zhongdian**, two seen, February 1995 (Kraageveld 1995, *Oriental Bird Club Bull.* 22 [1995]: 57–62); near **Li Shan** (at 26°15'N 103°41'E), Xuanwei city, satellite-tracked juvenile, November 1998–January 1999 (M. J. Ueta *in litt.* 1999); **Yingjiang county**, immature female collected, March 1991 (Gao Wei *in litt.* 1997); **Ruili county**, western Yunnan, one seen, January 1995 (Hornskov 1995b);

■ **Guizhou Tuoda** forest farm, Cao Hai, one seen, December 1991 (Edge *et al.* 1991); **Cao Hai**, one seen, January 1988 (Swengel and Swengel 1988), three seen, December 1990 (Lewthwaite 1992), three seen in south Cao Hai, one in south-west Cao Hai, December 1991 (Edge *et al.* 1991), 2–4, December 1997 (Lewthwaite 1997); **Weining county**, winter visitor, c.2,230 m (Zhu Jingyi *et al.* 1998); **Yingpan**, December 1989 (female in KIZCN); **Panxian county**, young bird captured, December 1989 (Gao Wei *in litt.* 1997);

■ **Shaanxi** Yellow River, **Heyang county**, five seen, February–March 1995 (Wu Jiayan *et al.* 1998); **unnamed locality** (at 35°07'N 109°43'E), north-east of Xi'an, satellite-tracked juvenile, November 1998 (M. J. Ueta *in litt.* 1999); northern slopes of **Qinling Shan**, passage migrant and/or winter visitor (Cheng Tso-hsin *et al.* 1973, Zheng Shengwu 1994); unspecified locality, nineteenth century (A. David in La Touche 1925–1934);

■ **Hebei Longhua county**, adult and two subadults seen and a nest found, August 1998 (Wu Minglu *et al.* 1999); **Huai'an county**, two subadults seen, October 1998, subadult seen, November 1998 (Wu Minglu *et al.* 1999); **Beidaihe**, 10 seen flying south, September–October 1986, three, October–November 1987, five, October–November 1988, three, October 1989, three, October–November 1990 (Williams *et al.* 1992, Xu Weishu *in litt.* 1997), “scarce to uncommon” (Beidaihe Bird Society 1992); near Lushui Chi lake, **Luannan county**, two adults seen, November 1997 (Wu Minglu *et al.* 1999); **Taihang Shan**, Jingxing county, nesting pair with two chicks, June 1997 (Wu Minglu *et al.* 1999);

■ **Beijing Song Shan National Nature Reserve**, undated (MacKinnon *et al.* 1996); **Bada Ling**, near the Great Wall, one seen, May 1997 (Doughty *in litt.* 1997); **Xi Shan**, November 1935, September 1936, undated (three specimens in ASCN); **Beijing**, adult male specimen obtained, autumn 1919 (Wilder and Hubbard 1924), single females collected, September 1936, November 1982, specimens in BNHMCN (Cai Qikan *per* Gao Wei *in litt.* 1997);

■ **Shandong Changdao National Nature Reserve**, undated (Liu Donglai *et al.* 1996); Qingdao Bird Nature Reserve, **Qingdao**, undated (Liu Donglai *et al.* 1996);

■ **Henan Yellow River** (Huang He), “common” in winter (Fu Tung-sheng 1937);

■ **Hubei Dong Hu** lake, Wuhan, February 1959 (female in WUCN);

■ **Jiangsu Yancheng Nature Reserve**, Xiangshu, Binhai, Sheyang, Da Feng and Dongtai counties, “occasional visitor” (Wang Hui 1991), one seen, December 1997–January 1998 (Su Hualong *et al.* 1998);

■ **Zhejiang Pingyang county**, one collected, February 1954 (Zhuge Yang 1990); unspecified localities, undated (Zhu Xi and Yang Chunjiang 1988);

■ **Fujian Guadun** (Kuatun), in Wuyi Shan Nature Reserve, autumn 1910 (juvenile in AMNH); **Nanping** (Yenping), several collected (Caldwell and Caldwell 1931); near **Fuzhou** (Foochow), immature male collected, December 1861, female probably of this species collected, winter 1860/1861 (Swinhoe 1863a), January, February, November and December 1871–1900 (11 specimens in BMNH), three immatures collected, November 1885 and January 1886 (Styan 1887), live bird captured, c.1890 (La Touche 1892), March 1896 (male in FMNH), common in winter in the Foochow valley, and often up to two or three together on the flats and sandbanks of the river below Foochow, early twentieth century (La Touche 1925–1934), 1924, December 1930, February 1932 (four specimens in ASCN), before December 1957 (specimen in NEFUCN); **Gu Shan** (Kushan), Fuzhou, January 1866 (juvenile female in AMNH);

■ **Jiangxi Poyang Hu Nature Reserve**, two seen between 1986 and 1991 (Lewthwaite 1992);

■ **Guangdong Zhaoqing city**, live juvenile female obtained in the market, April 1987 (Gao Yuren *per* Gao Wei *in litt.* 1997); along **Bei Jiang** river, Yingdo, one seen in 1989–1990 (J. Whblodon *per* C. Ma *in litt.* 1998).

■ **HONG KONG** The species is a regular winter visitor, with roughly 10 every winter and a maximum count of 21 in February 1993, specific localities being: **Ma Tso Lung, Lok Ma Chau, Lin Barn Tsuen, Long Valley, Mai Po, Deep Bay** and **Kam Tin** (HKBWS database).

■ **TAIWAN** The species is a rare passage migrant and winter visitor, with records as follows: **Laomei**, Taipei, one seen, April 1997 (CWBF database), one seen, April 1998 (Woeihorn Fang *in litt.* 1998); **Yangmingshan**, Taipei, two, 1995 (CWBF database); **Kuanyin Shan**, Taipei, one seen, March 1993, one seen, March–May 1995 (CWBF database); **Tatan** township, Taoyuan county, one seen, February 1996 (CWBF database); **Kungliao**, Taipei, one, 1996 (CWBF database); **Tienliaoyang**, Taipei, one seen, November 1996 to March 1997 (CWBF database); **Kangnan**, Hsinchu county, subadult seen, February 1989 (Lin Wen-horn 1997); c.1 km south of **Tachia estuary**, Ching-shui town, Taichung county, one seen, November 1997 (CWBF database); **Pahsien Shan**, Hoping township, Taichung county, one seen, December 1996 (CWBF database); **Tienwei** township, Changhua county, subadult, August 1996 (CWBF database); **Aoku**, Chiayi county, subadult seen, November 1995 and (probably the same bird) January 1996, subadult seen, September 1996 (CWBF database); **Wanshou Shan** (Chai Shan, Ape's Hill), Kaohsiung, one seen, February 1865 (Lin Wen-horn 1997); **Sheting Park**, Kenting, Pingtung county, one seen, October 1995, two, 1997 (CWBF database).

■ **PAKISTAN** The species is primarily a scarce winter migrant to various regions, but a few pairs formerly bred in the arid hill ranges of Kalat and Lasbela districts, Baluchistan (Baker 1922–1930, Roberts 1991–1992; see Remarks 2). Although the few early breeding records from north Pakistan, including one from Dera Ismail Khan, North-West Frontier Province (NWFP) (Baker 1922–1930), are best treated as unconfirmed (see Remarks 1), a record of breeding at Jhelum in Punjab (Ratray 1897), is certainly authentic as a specimen was taken (Ali and Ripley 1968–1998). According to Roberts (1991–1992), it has never been recorded in higher regions of northern Baluchistan or in the northern Himalayan regions of the country. Records are from: ■ **North-West Frontier Province Pabbi** swamp, Peshawar district, December 1925 (Briggs and Osmaston 1928); **Margalla hills**, February 1987 (Mallalieu 1988); **Rawal lake**, near Rawalpindi, two, January 1980 (Corfield 1983); **Kohat** and **Kurram valley**, 1904–1907 (Whitehead 1909, 1910–1911); **Samilzai plain**, Hangu valley, one, fighting with a jackal, December 1912 (Magrath 1913); **Dera Ismail Khan**, with an undated and unconfirmed breeding report (Baker 1922–1930; see Remarks 1), and recent winter records (and one summer record), with 2–5 sightings annually during the 1990s (Kylänpää 2000); Durgai, Chitral (not mapped), undated (Richardson 1895); ■ **Baluchistan** (see Remarks 2) **Murdan**, November and December 1870 (two specimens in BMNH); **Quetta**, several, May 1880 and July 1888 (Murray 1887, Christison 1941); **Kalat** district, breeding, undated (Eates 1940–1950); **Hab valley**, Lasbela, breeding, February and November 1944 (Eates 1940–1950), and in the adjacent Kirthar range,

1–2, November 1967 (Mountfort and Poore 1968; also Holmes and Wright 1968–1969); **Moidan**, one nest, March 1946 (Eates 1940–1950); ■ **Sind** unspecified localities, Sind hills, 1890s (Baker 1922–1930), or hills of Karachi and southern Sind (Roberts *et al.* 1986); **Ghauspur** (Ghauspur jheel), February 1972 (Koning and Walmsley 1972); **Rohri**, several, undated (Brooks 1879); Nama Dingno, north-west of **Sukkur**, two, February 1988 (Hirschfeld *et al.* 1988); **Qambar**, January 1872 (Hume 1872–1873); **Drigh Lake Wildlife Sanctuary**, Larkana district, undated (Scott 1989); **Manchar lake**, Dadu district, one adult, undated (Ticehurst 1922–1924), apparently a common winter visitor, undated (Ali 1928), one, probably 1960s (Roberts 1991–1992; also Holmes and Wright 1968–1969); **Pithoro** (Pithora), October 1918 (specimen in BNHS, Abdulali 1968–1996); **Khar**, two, February 1988 (Hirschfeld *et al.* 1988); **Hab dam**, one, February 1988 (Hirschfeld *et al.* 1988); **Khinjar lake**, January–February 1934 (male and female in UMMZ); **Karachi**, at the airport, one, undated (Roberts 1991–1992); **Mauripur**, 10, March 1988, one, February 1988 (Hirschfeld *et al.* 1988); **Thar Parkar district**, undated (Roberts 1991–1992); **Haleji lake** (Haleji dhand), Thatta district, February 1988, up to seven, February–March 1988 (Hirschfeld *et al.* 1988); **Indus delta**, one, November 1967 (Mountfort and Poore 1968); ■ **Punjab** between **Haripur** and Hasan Abdal, just outside Rawalpindi district, December 1925 (Whistler 1930); between Islamabad and Peshawar, and thus presumably in the region of **Attock**, January 1987 (Mallalieu 1988); **Islamabad**, at “Islamabad Park”, two, February 1987 (Mallalieu 1988), with a subsequent undated and possibly retrospective record (Jackson and Pyhälä 1997); **Rawalpindi**, “by the Leh”, April 1926 (Whistler 1930); Jhelum (not mapped), female shot on nest, April, 1890s (Ratray 1897); **Khabbaki lake**, December, year unspecified (Roberts 1991–1992); **Wazirabad**, February 1907 (female in BNHS, Abdulali 1968–1996); **Kamoke**, Gujranwala district, undated (male in AMNH); **Lahore**, August 1906 (specimen in BNHS, Abdulali 1968–1996), one immature and one adult, January/February 1931 (male in FMNH, Koelz 1940); **Mochiwala**, Jhang district, December 1919 (female in BMNH); **Fort Munro**, Sulaiman hills, Dera Gazi Khan, 2,100 m, one, possibly June 1930 (Waite 1934); **Lal Suhanra National Park**, undated (Scott 1989); **Cholistan**, undated (Roberts 1991–1992).

■ **INDIA** The only confirmed breeding record comes from Haryana, where a female was shot on her nest (Ali and Ripley 1968–1998); in general the species is a winter visitor to the north, straggling southward in smaller numbers to Tamil Nadu. Records are as follows:

■ **Jammu and Kashmir** unspecified localities in the **Kashmir valley**, four, December 1895 (Oberholser 1900), around 1907 (Ward 1906–1908);

■ **Himachal Pradesh Tundah Sanctuary**, listed (Singh *et al.* 1991); **Kugti Sanctuary**, listed (Singh *et al.* 1991); **Rohtang pass**, Lahul, one, June 1914 (Babault 1920); **Dharmsala**, 1918–1919 (Hingston 1921) and Jathingri, 110 km east of Dharmsala, at least 2–3 immatures, and up to 40 passing through in one day (see under Migration), November 1923 (Donald 1924), also nearby at McLeod Ganj, where two were near Triund, November 1988 (Bose *et al.* 1989); **Palampur**, adults in January 1922 and 1923 (Whistler 1926a); **Mandi**, 2–3 km north of old Manali, juvenile, April 1998 (A. Prasad *in litt.* 1999); **Kotgarh** (Kotegurh), several, pre-1880 (Donald 1918–1921);

■ **Punjab Hoshiarpur**, January 1901 (specimen in BNHS, Abdulali 1968–1996); **Harike Lake Wildlife Sanctuary**, recorded, 1981 (Ali *et al.* 1981), six, February–May 1994 (P. Undeland *in litt.* 1995);

■ **Haryana Chandigarh** (Chandighar), immature, February 1916 (Whistler 1918); **Ambala**, January 1867 (female in BMNH; Beavan 1868); **Sirsa district**, November and December 1867 (four specimens in BMNH), October 1869 (female in BMNH), November and December 1870 (two specimens in BMNH), pre-1885 (female in BMNH), November 1914 (specimen in BMNH), February 1931 (female in FMNH), two adult females and six immatures at an unspecified locality, January–March 1933 (Koelz 1940), and at Parwali lake near Sirsa town,

May 1933 (female in UMMZ); **Hansi**, a female shot on the nest, February, year unspecified (F. R. Blewitt in Donald 1918–1921, Ali and Ripley 1968–1998); **Rohtak**, February 1869 (female in BMNH); **Sultanpur National Park**, one, January 1983 (G. Ouweneel *in litt.* 1999), one, December 1990 (Adriaensen *et al.* 1991), two, January 1993 (P. Alström, U. Olsson and D. Zetterström *in litt.* 2000); **Garhi Harsaru** (“Gurri Hursord”), Gurgaon district, January 1868 (male in BMNH), and unspecified localities in the same district, March 1868 (female in BMNH), October 1868 (male in BMNH), February 1869 (two specimens in BMNH);

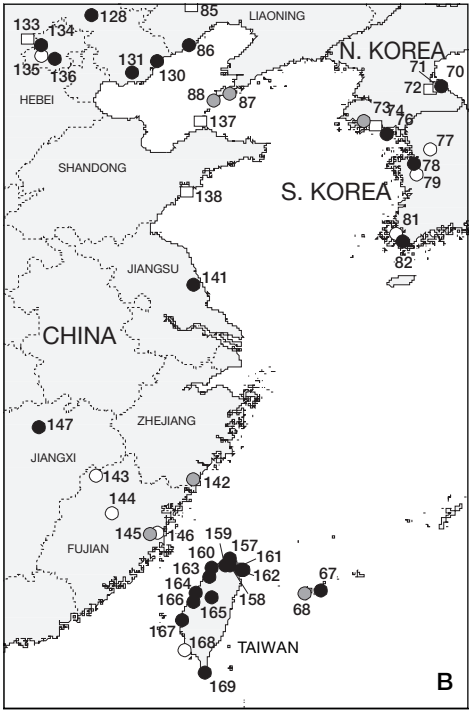
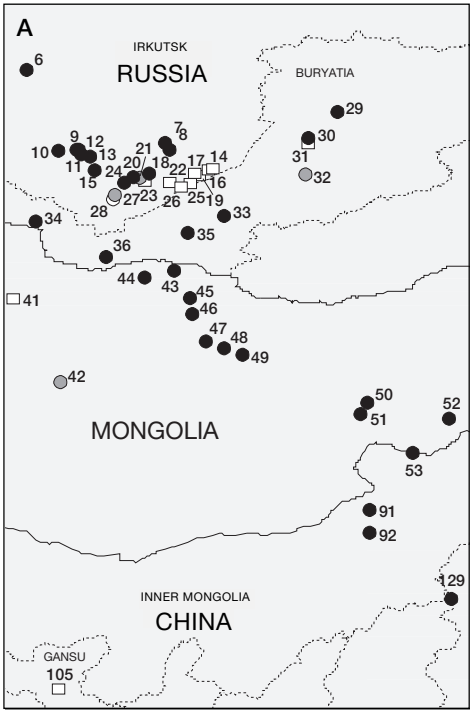
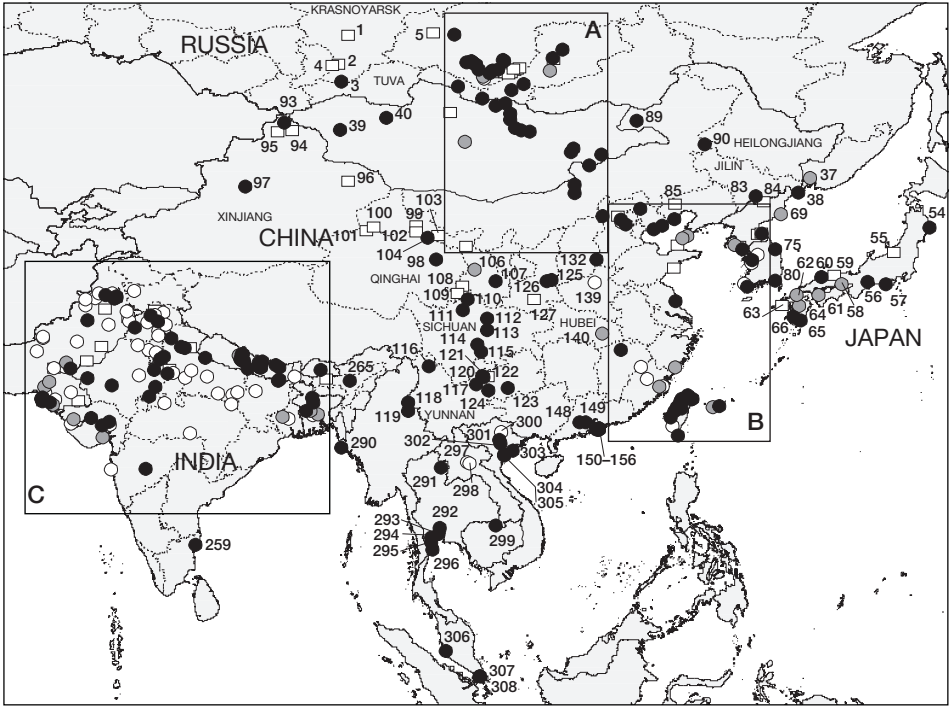
■ **Delhi Delhi**, “not at all common”, but visiting “refuse dumps”, 1931–1947 (Frome 1947–1948), several nearby, winter 1952–1953, and believed to occur “nearly every winter” (Hutson 1954), with an undated report from “Qadipur” (near Delhi) of a bird identified as Golden Eagle *Aquila chrysaetos* feeding with vultures (Hutson 1954) being eminently more likely (on distributional and behavioural grounds) to have been an Imperial Eagle, and recent records in 1970s (Vyas 1979), and from near Delhi in March 1981 (Krabbe 1981);

■ **Rajasthan Sariska Wildlife Sanctuary** (Tiger Reserve), January 1971 (Aarestrup *et al.* 1971) including at Karnakawas, one, January 1985 (Andersen *et al.* 1986), one, January 1990 (Sankar *et al.* 1993); **Keoladeo National Park**, Bharatpur, seen regularly up to the present with records from December 1970 (Aarestrup *et al.* 1971), highest counts including up to 10, January 1981 (Bundy 1985), 4–5, January 1983 (Bult 1983), up to nine, February 1983 (A. Dean *in litt.* 1999), 10, December 1984–January 1985 (Andersen *et al.* 1986), 10, December 1985 (Naoroji 1990), 11, January–February 1989 (Linderstrom 1989), and numbers apparently falling slightly in the 1990s to 1–4 individuals (Buckton and Morris 1990, Adriaensen *et al.* 1991, D. Dann *in litt.* 1999, G. Ouweneel *in litt.* 1999), and a maximum of 6–7, January 1993 (P. Alström, U. Olsson and D. Zetterström *in litt.* 2000); **Sambhar lake**, December 1869 (male in BMNH); **Jaisalmer**, adult, January 1990 (Buckton and Morris 1990), January 1994 (Drijvers 1995); Gurah Vishnoyia, **Jodhpur**, one, January 1987 (G. Ouweneel *in litt.* 1999); **Ranthambhore National Park**, adult, January 1987 (G. Ouweneel *in litt.* 1999); **Alniya Nadi** (Alniya dam), near Kota, two, 1990–1992 (Vyas 1993);

■ **Gujarat Saurashtra** (roughly = Kathiawar peninsula), regularly seen during winter along the eastern coast (but see Food), unspecified years (Dharmakumarsinhji 1955); **Little Rann of Kutch**, including “Pungbet”, February 1946 (two specimens in BNHS, Ali 1954–1955, Abdulali 1968–1996), four in 10 days, December 1993 (Samant *et al.* 1995); 12 km from **Bhuj**, December 1966 (Himmatsinhji 1970); Visadpura, **Ahmedabad**, juvenile, January 1987 (G. Ouweneel *in litt.* 1999); **Mandvi**, three, July 1947 (G. M. B. Sparks *in litt.* 2000); **Pariej**, Kaira district, December 1945 (Ali 1954–1955); **Nalsarovar** (Nalsarovar Sanctuary), adult, January 1987 (G. Ouweneel *in litt.* 1999); **Bhavnagar**, January 1962 (male in BNHS, Abdulali 1968–1996);

■ **Uttar Pradesh Dehra Dun**, winter visitor, unspecified years (Osmaston 1935), uncommon winter visitor, 1946–1951 (Wright 1957), and twice seen over the New Forest, including one in February 1998 (Singh 2000); **Corbett National Park**, one, February 1989 (van Groen 1989), and at Ramganga, one, January 1991 (Adriaensen *et al.* 1991); **Garjia**, February 1990 (Hough 1990); **Naini Tal**, undated (Hudson 1930; also Tak 1995); one on the Chandanchowki–Dudwa road, presumably near **Dudwa National Park**, 1992 (S. Javed *in litt.* 1999); **Mathura** (= Muttra), January, pre-1885 (female in BMNH); **Fatehgarh** (Futtehgurh), 1871–1872 (three females in BMNH, A. Anderson 1871a, 1872a), November 1874 (male in BMNH); **Agra**, February, pre-1885 (male in BMNH); Bangla Bazar, **Lucknow**, “fairly often”, undated (Jesse 1902–1903); **Etawah**, 1863 (specimen in BMNH), November and December 1865 (two specimens in BMNH), January 1866 (female in BMNH), January and February 1867 (three specimens in BMNH), at Loyah, February 1870 and February 1871 (two specimens in BMNH), January 1872 (specimen in BMNH, Anderson 1872b); **Mainpur** (Mynpuri), February and March 1871 (three specimens in BMNH), February 1872 (male in BMNH); **Allahabad**, December 1874 (specimen in BMNH); **Mughal Sarai**, February 1875 (female in BMNH); “Chota Mirzapur”, presumably near **Mirzapur**, February 1875 (male in BMNH);

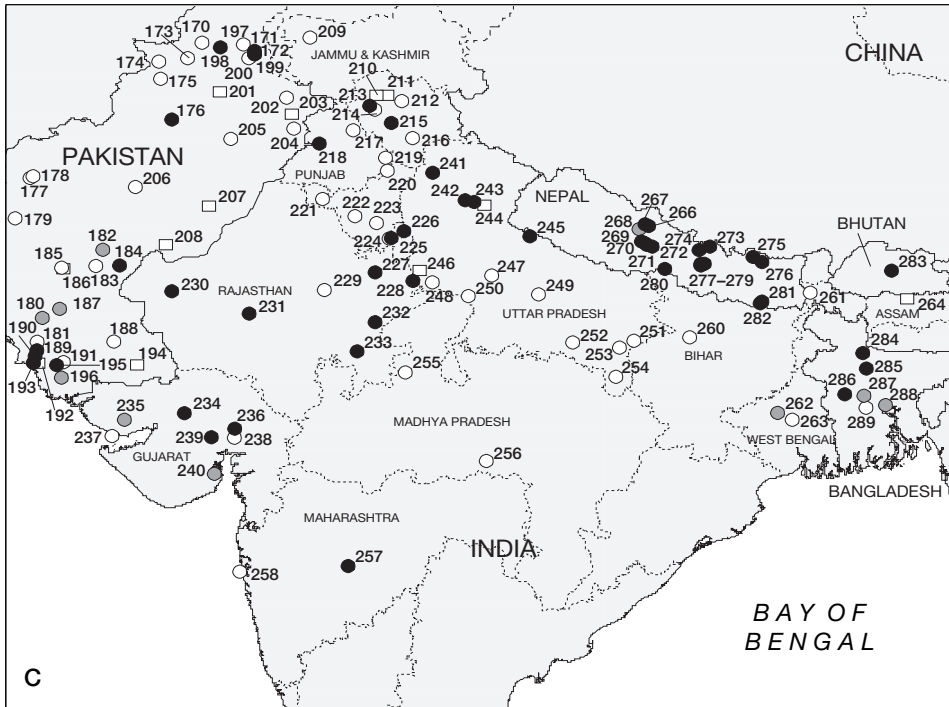
Threatened birds of Asia



The distribution of Imperial Eagle *Aquila heliaca* (maps opposite): (1) Krasnoyarsk; (2) Minusinsk basin; (3) Us depression; (4) Sayano-Shushenskiy Reserve; (5) Tazheranskaya steppe; (6) Bratskoye reservoir; (7) Kachug; (8) Kharbatovo; (9) Unga river; (10) Nukuty; (11) Balagansk; (12) Osa river; (13) Obusa river; (14) Khuzhir; (15) Bokhan; (16) Elga; (17) Sarma; (18) Bayanday; (19) Tashkay; (20) Oloy; (21) Olzony; (22) Kosaya Step'; (23) Khaday; (24) Ust'-Ordynskiy; (25) Anga river; (26) Krestovaya; (27) Kuda; (28) Irkutsk; (29) Ulunkhan; (30) Argoda river; (31) Ulan-Burga river; (32) Zarmat; (33) Ulan-Ude; (34) Kyren; (35) Tokhoy lake; (36) unnamed locality; (37) Ussuriysk; (38) Krabbe peninsula; (39) Khar Us Nuur; (40) unnamed locality; (41) Selenge river; (42) Khujirt; (43) Orkhon river; (44) unnamed locality; (45) unnamed locality; (46) unnamed locality; (47) unnamed locality; (48) Terelja; (49) unnamed locality; (50) unnamed locality; (51) unnamed locality; (52) unnamed locality; (53) unnamed locality; (54) Miyako-shi; (55) Niigata; (56) Ibi-gawa; (57) Oigawa river mouth; (58) Ichi-kawa; (59) Tottori; (60) Hii-gawa; (61) Matsuyama-shi; (62) Kitakyushu-shi; (63) Nagasaki; (64) Ichinomiya-cho; (65) Miyakonojo-shi; (66) Izumi; (67) Ishigaki-jima; (68) Iriomote-jima; (69) Yang-do; (70) Dongjong lake; (71) Tongjong-ho; (72) Anbyon; (73) Sahyon-ni; (74) Chongdan; (75) Kyongpo lake; (76) Han estuary; (77) Ichon; (78) Shihwa reclamation lake; (79) South Chungchong; (80) Nakdong estuary; (81) Mokpo; (82) Haenam; (83) Fusong county; (84) Changbai Shan; (85) Chaoyang; (86) Suizhong county; (87) Dalian city; (88) Laotie Shan; (89) Dalai Hu National Nature Reserve; (90) Jalaid Qi; (91) unnamed locality; (92) unnamed locality; (93) Hom Hanas Mongolzu Xiang; (94) Altay; (95) Burqin; (96) Barkol; (97) Bayanbulak; (98) Qinghai Hu; (99) Jiuquan county; (100) Subei county; (101) Aksay; (102) Qilian Shan; (103) Zhangye county; (104) Sunan county; (105) Wuwei county; (106) Lanzhou city; (107) unnamed locality; (108) Luqu county; (109) Maqu; (110) Zoigê; (111) unnamed locality; (112) unnamed locality; (113) unnamed locality; (114) unnamed locality; (115) unnamed locality; (116) Zhongdian; (117) Li Shan; (118) Yingjiang county; (119) Ruili county; (120) Tuoda; (121) Cao Hai; (122) Weining county; (123) Yingpan; (124) Panxian county; (125) Heyang county; (126) unnamed locality; (127) Qinling Shan; (128) Longhua county; (129) Hua'an county; (130) Beidaihe; (131) Luannan county; (132) Taihang Shan; (133) Song Shan National Nature Reserve; (134) Bada Ling; (135) Xi Shan; (136) Beijing; (137) Changdao National Nature Reserve; (138) Qingdao; (139) Yellow River; (140) Dong Hu; (141) Yancheng Nature Reserve; (142) Pingyang county; (143) Guadun; (144) Nanping; (145) Fuzhou; (146) Gu Shan; (147) Poyang Hu Nature Reserve; (148) Zhaoqing city; (149) Bei Jiang; (150) Ma Tso Lung; (151) Lok Ma Chau; (152) Lin Barn Tsuen; (153) Long Valley; (154) Mai Po; (155) Deep Bay; (156) Kam Tin; (157) Laomei; (158) Yangmingshan; (159) Kuanyin Shan; (160) Tatan; (161) Kungliao; (162) Tienliaoyang; (163) Kangnan; (164) Tachia estuary; (165) Pahsien Shan; (166) Tienwei; (167) Aoku; (168) Wanshou Shan; (169) Sheting Park; (170) Pabbi; (171) Margalla hills; (172) Rawal lake; (173) Kohat; (174) Samilzai plain; (175) Kurrum valley; (176) Dera Ismail Khan; (177) Murdan; (178) Quetta; (179) Kalat; (180) Hab valley; (181) Moidan; (182) Ghauspur; (183) Rohri; (184) Sukkur; (185) Qambar; (186) Drigh Lake Wildlife Sanctuary; (187) Manchar lake; (188) Pithoro; (189) Khar; (190) Hab dam; (191) Khinjar lake; (192) Karachi; (193) Mauripur; (194) Thar Parkar district; (195) Haleji lake; (196) Indus delta; (197) Haripur; (198) Attock; (199) Islamabad; (200) Rawalpindi; (201) Khabbaki lake; (202) Wazirabad; (203) Kamoke; (204) Lahore; (205) Mochiwala; (206) Fort Munro; (207) Lal Suhanra National Park; (208) Cholistan; (209) Kashmir valley; (210) Tundah Sanctuary; (211) Kugti Sanctuary; (212) Rohtang pass; (213) Dharmasala; (214) Palampur; (215) Mandi; (216) Kotgarh; (217) Hoshiarpur; (218) Harike Lake Wildlife Sanctuary; (219) Chandigarh; (220) Ambala; (221) Sirsa district; (222) Hansi; (223) Rohtak; (224) Sultanpur National Park; (225) Garhi Harsaru; (226) Delhi; (227) Sariska Wildlife Sanctuary; (228) Keoladeo National Park; (229) Sambhar lake; (230) Jaisalmer; (231) Jodhpur; (232) Ranthambhore National Park; (233) Alnia Nadi; (234) Little Rann of Kutch; (235) Bhuj; (236) Ahmedabad; (237) Mandvi; (238) Pariej; (239) Nalsarovar; (240) Bhavnagar; (241) Dehra Dun; (242) Corbett National Park; (243) Garjia; (244) Naini Tal; (245) Dudwa National Park; (246) Mathura; (247) Fatehgarh; (248) Agra; (249) Lucknow; (250) Etawah; (251) Mainpur; (252) Allahabad; (253) Mughal Sarai; (254) Mirzapur; (255) Guna; (256) Seoni; (257) Nandur; (258) Bombay; (259) Vedanthangal Sanctuary; (260) Dinapur; (261) Kurseong; (262) Panagarh; (263) Bardhaman; (264) Manas National Park; (265) Kaziranga National Park; (266) Kagbeni; (267) Muktinath; (268) Tukche; (269) Ghorepani; (270) Birethante; (271) Khare; (272) Pokhara valley; (273) Langtang; (274) Dhunche; (275) Dole; (276) Makalu Barun Conservation Area; (277) Gokarna; (278) Nagarjung; (279) Manohara river; (280) Royal Chitwan National Park; (281) Kosi Tappu Wildlife Reserve; (282) Kosi barrage; (283) Tongsa; (284) Bahadurabad; (285) Jamuna river; (286) Pabna; (287) Uttar Ara; (288) Dhaka; (289) Faridpur; (290) Teknaf; (291) Doi Wao; (292) Sam Khok; (293) Ta Tako; (294) Khao Yoi; (295) Cha-am district; (296) Khao Sam Roi Yot National Park; (297) Muong Soui; (298) Plain of Jars; (299) Ban Khiam; (300) Bac Kan; (301) Tam Dao National Park; (302) Phuc Yen; (303) Thai Binh; (304) Hoa Lu; (305) Ninh Binh; (306) Sekinchan; (307) Ponggol; (308) Tanah Merah.

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

- **Madhya Pradesh Guna** (as “Ghunar”), pre-1885 (specimen in BMNH), and (as “Goon”) 1918 (*J. Bombay Nat. Hist. Soc.* 26: 701, specimen in BNHS); **Seoni**, 1874 (male in BMNH);
- **Maharashtra Nandur**—Madhameshwar, adult, December 1983 (Goenka *et al.* 1985); **Bombay** (= Mumbai), December 1939 (female in FMNH);
- **Tamil Nadu Vedanthangal Sanctuary**, January 1991 (*Oriental Bird Club Bull.* 13: 49–50);
- **Bihar Dinapur**, December 1873 (male in BMNH);



The distribution of Imperial Eagle *Aquila heliaca* (map C): (170) Pabbi; (171) Margalla hills; (172) Rawal lake; (173) Kohat; (174) Samilzai plain; (175) Kurram valley; (176) Dera Ismail Khan; (177) Murdan; (178) Quetta; (179) Kalat; (180) Hab valley; (181) Moidan; (182) Ghauspur; (183) Rohri; (184) Sukkur; (185) Qambar; (186) Drigh Lake Wildlife Sanctuary; (187) Manchar lake; (188) Pithoro; (189) Khar; (190) Hab dam; (191) Khinjar lake; (192) Karachi; (193) Mauripur; (194) Thar Parkar district; (195) Haleji lake; (196) Indus delta; (197) Haripur; (198) Attock; (199) Islamabad; (200) Rawalpindi; (201) Khabbaki lake; (202) Wazirabad; (203) Kamoke; (204) Lahore; (205) Mochiwala; (206) Fort Munro; (207) Lal Suhanra National Park; (208) Cholistan; (209) Kashmir valley; (210) Tundah Sanctuary; (211) Kugti Sanctuary; (212) Rohtang pass; (213) Dharmsala; (214) Palampur; (215) Mandi; (216) Kotgarh; (217) Hoshiarpur; (218) Harike Lake Wildlife Sanctuary; (219) Chandigarh; (220) Ambala; (221) Sirsa district; (222) Hansi; (223) Rohtak; (224) Sultanpur National Park; (225) Garhi Harsaru; (226) Delhi; (227) Sariska Wildlife Sanctuary; (228) Keoladeo National Park; (229) Sambhar lake; (230) Jaisalmer; (231) Jodhpur; (232) Ranthambhore National Park; (233) Alnia Nadi; (234) Little Rann of Kutch; (235) Bhuj; (236) Ahmedabad; (237) Mandvi; (238) Pariej; (239) Nalsarovar; (240) Bhavnagar; (241) Dehra Dun; (242) Corbett National Park; (243) Garjia; (244) Naini Tal; (245) Dudwa National Park; (246) Mathura; (247) Fatehgarh; (248) Agra; (249) Lucknow; (250) Etawah; (251) Mainpur; (252) Allahabad; (253) Mughal Sarai; (254) Mirzapur; (255) Guna; (256) Seoni; (257) Nandur; (258) Bombay; (260) Dinapur; (261) Kurseong; (262) Panagarh; (263) Bardhaman; (264) Manas National Park; (265) Kaziranga National Park; (266) Kagbeni; (267) Muktinath; (268) Tukche; (269) Ghorepani; (270) Birethante; (271) Khare; (272) Pokhara valley; (273) Langtang; (274) Dhunche; (275) Dole; (276) Makalu Barun Conservation Area; (277) Gokarna; (278) Nagarjung; (279) Manohara river; (280) Royal Chitwan National Park; (281) Kosi Tappu Wildlife Reserve; (282) Kosi barrage; (283) Tongsa; (284) Bahadurabad; (285) Jamuna river; (286) Pabna; (287) Uttar Ara; (288) Dhaka; (289) Faridpur; (290) Teknaf.

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

■ **West Bengal Kurseong**, Darjeeling, November 1911 (specimen in BNHS, Abdulali 1968–1996); 13 km west of **Panagarh**, at the DVC Experimental Farm, adult, January 1968 (Gauntlett 1986); **Bardhaman** (= Bardwan), undated (Ball 1878);

■ **Assam Manas National Park**, undated (Anon. 1990b); **Kaziranga National Park**, adult, January 1983 (G. Ouweneel *in litt.* 1999), several sightings, early 1990s (Bhattacharjee *et al.* 1996), one, December 1994 (Martins 1994), one at Dunga, March 1999 (Barua and Sharma 1999).

■ **NEPAL** Records (see Remarks 3) are from: **Kagbeni**, upper Kali Gandaki valley, one, April 1981 (Wolstencroft 1981); Khinge, west of **Muktinath**, upper Kali Gandaki valley, one, October 1984 (Christensen *et al.* 1984); **Tukche**, upper Kali Gandaki valley, 2,550 m, two, September 1973 (Beaman 1973); **Ghorepani**, Kali Gandaki valley, one, November 1986 (Inskipp and Inskipp 1986a); between **Birethante** and Naudanda, lower Kali Gandaki valley, one, October 1984 (Christensen *et al.* 1984); **Khare**, Kali Gandaki valley, nine, October and November 1985 (de Roder 1989); **Pokhara valley**, several, November 1976 (Fleming *et al.* 1984), and at Pokhara itself, one, February 1971 (Aarestrup *et al.* 1971), May 1981 (Krabbe 1981), one nearby, March 1985 (Clugston 1985), and another between Pokhara and Tukche, February 1971 (Aarestrup *et al.* 1971); **Langtang**, adult, March 1980 (Petersen 1983, Halberg and Petersen 1984); **Dhunge**, 1,950 m, one, January 1981 (del Nevo and Ewins 1981); Sagarmatha National Park, at **Dole**, 3,900 m, one, May 1981 (Mills and Preston 1981); Sisuwa valley, near Chitre, in **Makalu Barun Conservation Area**, several, November 1994 (Shakya 1997); Kathmandu valley, undated records from unspecified localities (Hodgson 1844), and more recently at **Gokarna**, two, January 1989 (Cooper and Cooper 1989), **Nagarjung**, one, November 1987 (Vyas 1988), and **Manohara river**, one, January 1993 (*Nepal Birdwatching Club Newsletter* 2, 1 [1993]: 2; **Royal Chitwan National Park**, one, March 1986 (S. C. Madge 1986), two, February 1988 (Sorensen 1988), one, January 1991 (B. Watts *in litt.* 1991) and within the park at Meghauli, one, May 1986 (Heath 1986), and at Narayani river, one, December 1986 (Halliday 1986); **Kosi Tappu Wildlife Reserve**, two, March 1989 (Dodman and Guinan 1989), 1–2, present most years between 1993 and 1997 (Wheeldon 1995, H. Choudhary verbally 1997); **Kosi barrage**, singles, February 1981 (Mills and Preston 1981), March 1981 (Inskipp and Inskipp 1981a), March 1982 (Turton and Speight 1982), April 1982 (Fairbank 1982), April 1983 (Alström and Olsson 1983) and February 1987 (Bräunlich 1987), two, January 1989 (Barnes 1989) and regularly along the Kosi river, including one in November 1992 (H. S. Baral *in litt.* 1997, R. Subba verbally 1997).

■ **BHUTAN** There is a single record of one bird between **Tongsa** and Jamkar, April 1998 (King 1998a).

■ **BANGLADESH** The species was listed as a winter visitor to the west and north-west by Rashid (1967), who considered it likely also to visit the coast and south-central portions of the country. However, there are very few confirmed records, as follows: **Bahadurabad**, one 6 km north of the railhead on an island in the Brahmaputra river, December 1992 (Thompson *et al.* 1993); **Jamuna river**, winter 1994/1995 (*Oriental Bird Club Bull.* 24 [1996]: 7–12); **Pabna**, one, January 1982 (Thompson *et al.* 1993); **Uttar Ara** (Uttara), Dhaka, one, March 1978 (Thompson *et al.* 1993); from **Dhaka** (Dacca) to Sylhet, large numbers of eagles seen, including this species, undated (Simson 1882), and at “Dhaka airport”, one, December 1979 (Thompson *et al.* 1993); **Faridpur** (Furreedpore), one, January 1878 (Cripps 1878); **Teknaf**, two immatures, December 1988 (Thompson *et al.* 1993).

■ **MYANMAR** There were no confirmed records from Myanmar before 1998, as the “Plain-brown Imperial Eagle *Aquila mogilnik/bifasciata*” recorded in Pegu by Hume (1875a) refers to the Steppe Eagle *Aquila nipalensis*. However, the literature contains several references to unidentified eagles in the country and it is certain that it occurs at least rarely. The only acceptable record for the country appears to be that established by a satellite-tracked juvenile

which hatched in 1998 in Russia and spent its first winter (1998/1999) in Yunnan, China, occasionally wandering into northern Myanmar (M. J. Ueta *in litt.* 1999, V. V. Ryabtsev *in litt.* 2000), although no precise area was given and this record is not mapped.

■ **THAILAND** The species is a regular winter visitor in very small numbers, with records as follows: **Doi Wao**, Nan, December 1999 (*Bird Conserv. Soc. Thailand Bull.* 17, 2 [2000]: 14); **Sam Khok**, near Bangkok, two immatures, December 1984 (*Oriental Bird Club Bull.* 3 [1986]: 33–36); **Ta Tako**, c.50 km south of Nakhon Sawan, immature, February 1987 (D. Ogle *in litt.* 1987); **Khao Yoi**, Petchaburi (Phet Buri), one overhead, November 1988 (*Bangkok Bird Club Bull.* 6, 1 [1989]: 10); **Cha-am district**, Petchaburi, one first winter, February 1997 (*Bird Conserv. Soc. Thailand Bull.* 14, 4 [1997]: 15, *Oriental Bird Club Bull.* 26 [1997]: 60–66); **Khao Sam Roi Yot National Park**, one immature observed in November 1984 and (possibly the same bird) January 1985 (*Oriental Bird Club Bull.* 3 [1986]: 33–36), also a migrant coming in off the sea in November 1989 (*Bangkok Bird Club Bull.* 6, 12 [1989]: 11–12), and records of 1–2 wintering in several subsequent years, including in February 1995 (*Bird Conserv. Soc. Thailand Bull.* 12, 5 [1995]: 9). The bird that established the first confirmed record for Myanmar (see above) also wandered into parts of northern Thailand in 1998/1999 (M. J. Ueta *in litt.* 1999, V. V. Ryabtsev *in litt.* 2000).

■ **LAOS** There are very few records, and the species appears to have declined in the country since 1940, records being: **Muong Soui**, immature male, January 1926 (Delacour and Jabouille 1927b); **Plain of Jars**, Xiang Khouang (= Tranninh), regular (although see Remarks 1), c.1940 (David-Beaulieu 1944); Dong Khanthung proposed NBCA, 5 km to the south-east of **Ban Khiam** (Ban Khem), an apparent fourth-year bird, March 1997 (Round 1998).

■ **VIETNAM** The species is very rare in the country, most often being found in coastal and mountainous areas of the north (Nguyen Cu *in litt.* 1997; see Remarks 4), with records as follows: **Bac Kan**, young female collected, 1925 (Delacour *et al.* 1928); **Tam Dao National Park**, Vinh Phu, juvenile, December 1993 (Dymond 1998); **Phuc Yen**, Vinh Phu, adult, February 1995 (*Oriental Bird Club Bull.* 21 [1995]: 68–73), single, November 1995 (J. C. Eames *in litt.* 1997); **Thai Binh** estuary, Thai Binh, single, February 1996 (J. C. Eames *in litt.* 1997); **Hoa Lu** limestone area, Ninh Binh, one immature, December 1996 (A. Schaftenaar *in litt.* 1997); near **Ninh Binh** town, two, December 1994 (*Oriental Bird Club Bull.* 22 [1995]: 57–62); Cuc Phuong National Park (not mapped), one, December 1999 (*Oriental Bird Club Bull.* 31 [2000]: 49–57).

■ **MALAYSIA** The species is a vagrant during winter to Peninsular Malaysia (Wells 1999), with records from **Sekinchan**, Selangor, of one juvenile in February and March 1986, and a subadult at the same time in 1987 (Wells 1999).

■ **SINGAPORE** The species is a very rare winter visitor, although near-annual in the late 1980s and early 1990s (Lim 1994a, Wells 1999); **Ponggol**, 1–2 almost annually, 1987–1992 (Lim 1994a); **Tanah Merah**, one, December 1999 (Lim Kim Seng *in litt.* 2000, *Oriental Bird Club Bull.* 32 [2000]: 66–76).

POPULATION The Imperial Eagle occurs at low densities in most parts of its range, and its total world population is probably only a few thousand pairs (Heredia 1996). There has been a rapid decline in Europe, where the non-Russian population is estimated at 224–318 pairs, with populations in Hungary and Slovakia now increasing (Heredia 1996; also Magyar *et al.* 1998). The population in European Russia may total 600–900 pairs (Belik and Galushin 1996) and in Kazakhstan 750–800 pairs (Bragin 1999). Although currently stable, the Russian population is predicted to decline in the next 3–5 years (V. Galushin *in litt.* 1999). Details of population size in the Asian region follow.

Eastern Russia In Krasnoyarsk, a density of 2.5 pairs per 100 km² occurs on the western side of the Minusinsk depression, or 6.5 pairs per 100 km² in just the forested regions; the birds are much rarer on the eastern side of the depression, where the density is c.0.5 pairs per 100 km² (Kustov 1982 in Rogacheva 1992). The western side of the Minusinsk depression is one of the few areas in the former USSR where the situation facing this species is relatively favourable, because of low disturbance, a stable food supply and the availability of inaccessible nest sites (Kustov 1982 in Rogacheva 1992). There is (or was) a substantial breeding population in the Irkutsk region, with smaller numbers in Buryatia; in the early 1980s, 150 pairs were estimated for the Irkutsk region (Predbaykal'ye) (Ryabtsev 1984a), but these had declined to not more than 70 pairs by 1996 (V. V. Ryabtsev *in litt.* 1997). This decline began in the early 1960s, and intensified in the 1980s, and it is predicted that the population may further decline in the next 10 years to only 20–30 pairs (V. V. Ryabtsev *in litt.* 1997). Ten pairs nested on Priol'khon'ye forest-steppe in 1982–1983, but only 3–4 pairs were found there in 1993 and 1996 (Ryabtsev 1983, 1995, V. V. Ryabtsev *in litt.* 1997). Six to nine pairs were estimated on Ol'khon island in 1982 (Ryabtsev 1985), and, judging by the number of old nests present, it is assumed that 12–15 pairs had nested there in the 1960s and 1970s (a remarkable density in an area of 200 km² of suitable habitat) (V. V. Ryabtsev *in litt.* 1997). However, in July 1996 only 2–3 pairs were estimated to be nesting on the island (V. V. Ryabtsev *in litt.* 1997). On Balagansk-Nukutskaya forest-steppe, five occupied nests were found on the lower reaches of the Unga river in June 1964, 1.5–2 km apart (Sonin and Lipin 1980). Between 1964 and 1982, the nesting density there halved, and the number of sightings per 10 km of transect declined from 12.3 to 4.7 (V. V. Ryabtsev *in litt.* 1997). There have been no surveys since 1982, but there has presumably been a further decline as the only confirmed nesting was by single pairs in 1987 and 1995 (V. V. Popov *in litt.* 1996, V. V. Ryabtsev *in litt.* 1997). In Buryatia, this eagle is a “very rare” breeding species in the Tunkinskaya valley, with not more than 2–3 pairs nesting in the whole valley in 1991, while c.6 pairs were estimated in the Barguzinskaya valley in Barguzinskiy district in 1992 (V. V. Ryabtsev *in litt.* 1997). In summary, the entire Baikal population of the Imperial Eagle (breeding in the Irkutsk region, Ust'-Ordynskiy district and Buryatia) was estimated at 400–500 pairs in the late 1950s (c.300 of these in Predbaykal'ye—i.e. the Irkutsk region and Ust'-Ordynskiy district), but had fallen to 70–90 pairs by 1999, a sharp decline in 1983–1999 taking the population in Predbaykal'ye from 150–200 down to 40 pairs (V. V. Ryabtsev *in litt.* 2000).

Mongolia The status of this species is very poorly understood, as there have only been a handful of confirmed records, but it presumably could breed widely in the steppe and forest-steppe zones (see Distribution).

Japan and Korea It is a rare winter visitor to both countries (Austin 1948, Won 1963; see Distribution).

China There is little information on the population of this species in China, but it now appears to be an uncommon breeding bird in the north-west and possibly also the north-east, and a scarce passage and winter visitor in the south and on Taiwan. In the past, it was described as “common in the mountains and in Mongolia” (Père David in Swinhoe 1871), and “common” in winter along the Yellow River in Henan and “abundant” in the mountains in Ho-Nan and Shan-Si (Fu Tung-sheng 1937). It is now considered “rare” in north-east China (Liu Mingyu *et al.* 1988), and to have declined very significantly (Zheng Shengwu 1994). In Hong Kong, c.10 are present each winter (maximum 21), numbers appear to be stable, and the regular occurrence of first-winter birds indicates that the population concerned is breeding successfully (HKBWS *in litt.* 1997).

Pakistan In the nineteenth century this species was “common” in Sind, chiefly in the neighbourhood of large lakes (Hume 1872–1873). Around World War I, Ticehurst (1922–1924) thought that the species was “not a very uncommon winter visitor” to Sind, with 1–2 individuals frequenting every large inland lake. In Punjab, around Lahore, it was “rather

rare and only occasionally seen” in the 1930s (Koelz 1940), while in NWFP it was “a fairly common winter visitor” to the Kohat region between 1904 and 1907 (Whitehead 1909, 1910–1911). In Dera Ismail Khan district of NWFP, Kylänpää (2000) recorded the species 2–5 times annually in the 1990s, concluding that it was “scarce” in winter and “very rare” in summer. During five prolonged winter visits to wetlands of the Indus valley, 1970–1974, Koning (1976) encountered this species on 56 occasions (out of 442 large eagles). Judging from these accounts, the species was once considerably more abundant in Sind than it is today. However, in its winter quarters, solitary individuals are still regularly encountered in the major desert tracts of Cholistan and Thar Parkar (Roberts 1991–1992).

India Early reports suggest that the species was patchily common, especially in the plains of Uttar Pradesh and Gujarat, but apparently rare in the lowlands from Bihar eastwards (see Distribution). In the far north it was “not often to be seen; those obtained were killed in the winter in Kashmir” (Ward 1906–1908). Around Sirsa, Haryana, it was “rather rare and only occasionally seen” in the 1930s (Koelz 1940). It was once regular in winter in Gujarat, but it has become scarce in recent times (Khacher 1996). Between 1944 and 1948, only two individuals were certainly identified in Gujarat, although “several of the large eagles sparsely dotted about on the bare ground in the Little Rann of Kutch... were probably this species” (Ali 1954–1955; but see entry for Imperial Eagle in Ali and Ripley 1968–1998); it was apparently “not uncommon and a regular migrant” on the east coast of the Kathiawar peninsula during winter (Dharmakumarsinhji 1955; but see Food). Around Etawah and Fatehgarh, Uttar Pradesh, A. Anderson (1871a) stated that it “visits the plains in great numbers during the cold-weather months”, adding “it is no exaggeration to say that I have seen a dozen of them in a large plain in the course of a morning”. Around Lucknow, it was “fairly common” in the nineteenth century (Reid 1887) and considered “not uncommon, especially in dhak jungle” (Jesse 1902–1903). It was, at the same time, “by no means common” in the “Bombay Presidency” (at that time comprising Gujarat, Maharashtra and portions of central India) (Barnes 1885). In 1918–1919 it was considered “abundant in the cold season” at Dharmsala, Himachal Pradesh (Hingston 1921), although Whistler (1926a) was more cautious, stating that, while large eagles were common in the area (and “doubtless include this species”), only two Imperial Eagles were conclusively identified during his three winters in the region (1921–1923). There has been a considerable decline in numbers of large raptors throughout the country (Akhtar 1976, Samant *et al.* 1995, A. Prasad *in litt.* 2000) and the important Imperial Eagle population in north-west India appears to have declined in the late 1990s; for example, only small numbers (and, alarmingly, no juveniles) were seen at the “usual sites” in 1995 and 1996 (P. Alström, U. Olsson and D. Zetterström *in litt.* 2000).

Nepal An estimated population of 40 individuals occurs during winter (H. S. Baral *in litt.* 1997). Numbers are, however, probably declining as there seemed to be significantly fewer records in the 1990s than there were in the previous decade (C. Inskipp and T. P. Inskipp verbally 1998).

Bangladesh The species was perhaps fairly common in the nineteenth century: Simson (1882) mentioned that “on a voyage... from Dacca to Sylhet one cannot fail to be struck with the large number of eagles seen near the fishing-villages”, and amongst these he identified “a white-shouldered eagle” as *A. imperialis* (= *A. heliaca*). In recent years the species has been a “rare” visitor at best (Khan 1982, Harvey 1990). Thompson and Johnson (1996) stated that in the 1990s small numbers regularly wintered around riverine chars in Bangladesh, although there have apparently been only about five confirmed records for the country (P. M. Thompson *in litt.* 1997).

Thailand The species appears to have always been uncommon; currently, perhaps fewer than five individuals winter in the country (see Distribution).

Laos Again, it has apparently always been a rare winter migrant to northern Laos (Delacour 1929c), although reported regular sightings on the Plain of Jars (David-Beaulieu

1944) suggest that it might have been more frequent than other published records indicate. The lack of records elsewhere might merely reflect the difficulties in identification (Duckworth *et al.* 1999), or indeed David-Beaulieu (1944) may have misidentified Greater Spotted Eagles *A. clanga* for this species, as eagle identification was not refined at that time and his specimens have not been verified (J. W. Duckworth *in litt.* 2000). David-Beaulieu (1944) stated merely that an eagle species thought to be Imperial Eagle was common on the Plain of Jars, and that the same species was also numerous at Pleiku in Vietnam, but complained that it was “extremely difficult to obtain” (see also David-Beaulieu 1949–1950). There have been too few recent winter observations in Xiang Khouang province to assess its current status accurately, but it seems to be very scarce there and elsewhere in the country, appearing in very low numbers in winter or on passage (Duckworth *et al.* 1999).

Vietnam It is a scarce migrant, possibly wintering in small numbers (see Distribution).

ECOLOGY Habitat Outside the “Asian” region (as defined here) the Imperial Eagle is known as a lowland species that has been pushed to higher altitudes by persecution and habitat loss (Heredia 1996). In central and eastern Europe, breeding habitat consists of upland forests up to 1,000 m, but also steppes and agricultural areas with large trees, and in the Caucasus it occurs in lowland and riverine forests and semi-deserts (Heredia 1996). Birds seem to prefer wetlands for wintering, and feed largely on mammals, particularly suslik *Citellus citellus* (Heredia 1996).

Within the “Asian” region, the species breeds in areas of forest-steppe, surrounded by taiga forests in the Irkutsk region or in the bottoms of intermontane valleys in Pribaykal’ye, eastern Russia; the distribution of the species coincides almost exactly with traditional sheep-breeding regions, where its main prey species, the Siberian suslik *C. undulatus*, is most abundant (Ryabtsev 1984a). It also requires some patches of tall forest trees in order to nest (V. V. Ryabtsev *in litt.* 1997). It does not nest in places where the steppes and meadows have been so extensively ploughed that fields exceed 30–40% of the overall area; it was found nesting near settlements (within 1–3 km) and sheep-breeding farms (within 0.3–0.5 km) in the 1980s, as the local population (the Buryats) were well disposed towards the species because of religious traditions and customs (Ryabtsev 1984a, 1985, V. V. Ryabtsev *in litt.* 1997). In Xinjiang in China, it is found in grasslands at low or mid-altitudes and in broadleaf forest or mixed broadleaf-coniferous forest (Zheng Shengwu 1994). The breeding sites in southern Baluchistan in Pakistan seem unusual: they consisted mainly of stunted thorn trees growing out of crags or cliffs in rugged arid hill ranges (Eates 1940–1950, Roberts 1991–1992).

In its Asian winter quarters, the Imperial Eagle is an inhabitant of open plains or desert, with or without trees, generally avoiding high mountainous regions and coastlines (see Food) often being attracted to the vast assemblages of waterfowl which congregate around major lakes and wetland areas; large waterbodies, open wet marshes, wet paddyfields, sandy islands and extensive wetlands are favoured (Ali and Ripley 1968–1998, Ripley 1982, Inskipp and Inskipp 1991, Roberts 1991–1992, Grimmett *et al.* 1998); individuals have also been seen scavenging at municipal tips in winter (Whitehead 1909, 1910–1911, Mallalieu 1988, Wells 1999). Although it is generally a lowland or foothill bird, it has been recorded up to 3,900 m passing over the Himalayas (Inskipp and Inskipp 1991). In Hong Kong it favours fishpond areas, especially those where domestic duck are reared in combination with commercial fish (HKBWS *in litt.* 1997). In India, it was described by A. Anderson (1871a) as “very partial to large plains” in early winter, apparently moving to wetlands “as the season advances”. In Pakistan, Koning (1976) saw the majority of individuals in “open desert areas or lakes”, remarking that the species tended to avoid extensive areas of cultivation. However, in two successive winters, one adult roosted on the same power pylon over 6–8 weeks on the periphery of Karachi airport in open cultivated thorn scrub (Roberts 1991–1992). One was shot in Bangladesh from a plum tree on a sparsely cultivated plain (Cripps 1878). Roosting is

sometimes communal in the winter quarters, with 10–14 having been seen gathering at dusk to roost on trees or grassy banks in Israel (JAT), Saudi Arabia and India (Bundy 1985).

Food On the breeding grounds in eastern Russia, Siberian suslik is the main prey (Ryabtsev 1984b). When pellets and food remains were analysed, this species was found to comprise 46.8–71.9% of the eagle's diet, while mouse-like rodents comprised 3.0–7.3% (narrow-skulled *Microtus gregalis*, tundra *M. oeconomus* and water voles *Arvicola terrestris*); birds comprised 18.2–49.5% (less in forest-steppes, more in forested areas), including Northern Lapwing *Vanellus vanellus*, crows *Corvus*, Daurian Partridge *Perdix dauurica*, Rock Pigeon *Columba livia* and even Hen Harrier *Circus cyaneus* and Common Kestrel *Falco tinnunculus* (Ryabtsev 1984b). The eagle never attacks live lambs, and sheep with small lambs pay almost no attention to it (Ryabtsev 1984b).

In the wintering quarters it will also consume reptiles, amphibians, fish, birds and mammals (Ali and Ripley 1968–1998, Roberts 1991–1992). Individuals have been seen chasing hares *Lepus*, although when hunting live prey the species apparently usually seeks fairly small rodents, amphibians and reptiles; more manoeuvrable or sizeable prey is often stolen from smaller raptors or found when weak or dead (Donald 1918–1921, Ali and Ripley 1968–1998). Birds make up a large proportion of the diet in winter, especially wildfowl; individuals have been observed hunting (or at least following) large flocks of duck at Kosi barrage in winter (R. Subba verbally 1997). Avian prey species include a francolin *Francolinus* (Koelz 1940), grebe *Podiceps* (Oberholser 1900), Bar-headed Goose *Anser indicus* (Vyas 1993), Ruddy Shelduck *Tadorna ferruginea* (A. Anderson 1871a), Spot-billed Duck *Anas poecilorhyncha* (Anderson 1872b) and Common Sandpiper *Actitis hypoleucos* (most of these “doubtless pirated”) (Ali and Ripley 1968–1998). In Keoladeo National Park, the species has been witnessed devouring eggs and nestlings at the waterbird colony; one juvenile Imperial Eagle and two juvenile Greater Spotted Eagles consumed 38 clutches of Purple Heron *Ardea purpurea* and Grey Heron *A. cinerea* in one season, such that heronry success was nil (Naoroji 1990). It has also been reported eating Greater Flamingo *Phoenicopterus ruber* chicks (Naoroji 1990). Mammals are also consumed: in Kashmir the remains of a rat and a mongoose *Herpestes (javanicus) aureopunctatus* were found in the stomachs of specimens (Oberholser 1900), while in Pakistan the diet has included a “small fawn or other grazing animal” (Koelz 1940), and “mole-rats” (Whitehead 1909, 1910–1911), and in Thailand one wintering individual was recorded eating rats *Rattus* (D. Ogle *in litt.* 1987). However, a bird injured in Bangladesh was kept in captivity where it refused skinned rats but consumed dead birds (Cripps 1878). Reptiles are also popular prey, particularly in more arid habitats. Eagles taken in Gujarat, India, contained a c.36 cm long Russell's viper *Vipera russelli* and large spiny-tailed lizards *Uromastix hardwickii* (Ali and Ripley 1968–1998); in Pakistan they have been recorded eating monitor lizards *Varanus* (Whitehead 1909, 1910–1911). Amphibians and crustaceans sometimes make up small proportions of the diet. A. Anderson (1871a) found frogs in the crops of shot birds “on several occasions”, and the species has been recorded eating crabs on dry lake beds (Reid 1887). In the Kathiawar peninsula, Gujarat, it has been reported visiting intertidal areas to eat “mud-gobies, other fish, sea-snakes, lizards and shore birds”, and to snatch young and adult cormorants Phalacrocoracidae from colonies (Dharmakumarsinhji 1955), but as it is not otherwise known to frequent coastal sites this information should perhaps be regarded as provisional (see Remarks 1).

The Imperial Eagle is adept at robbing other birds of prey and at least in some areas gains access to the bulk of its food in this manner (Ali and Ripley 1968–1998, Roberts 1991–1992); in Pakistan, one was watched chasing a Laggar Falcon *Falco jugger* until it relinquished its catch (Whitehead 1909, 1910–1911). The discarded “entrails of a fowl” were stolen from a Black Kite by a Tawny Eagle *Aquila rapax* which was then robbed by an Imperial Eagle, seconds before the latter was shot in “the most public part” of a collecting camp (A. Anderson 1871a). Ticehurst (1922–1924) reported that, along with Pallas's Fish-eagle *Haliaeetus*

leucoryphus (see relevant account), the species took “any wounded bird not quickly retrieved” on duck shoots. It is certainly not averse to feeding on carrion when available, occasionally consorting with vultures around carcasses (A. Anderson 1871a, Hutson 1954, Roberts 1991–1992), and visiting municipal waste disposal sites (see Habitat). In Hong Kong it scavenges widely on carrion, including dead domestic ducks and rats (HKBWS *in litt.* 1997).

Breeding A great deal of information on breeding biology in populations at the western limit of the species's distribution is given by Brown and Amadon (1968) and Cramp and Simmons (1980). The vast majority of breeding pairs in Asia are to be found in a high-latitude swathe across Russia and northern China (and probably Mongolia), with an isolated (but now apparently extinct) breeding population in Pakistan. An account of their breeding behaviour follows.

The species occupies a permanent nesting range, repairing and re-using several nest sites in regular rotation (Roberts 1991–1992). In Predbaykal'ye in eastern Russia, 37 active nests and 20 old nests were located: they were usually 4.5–22 m (typically 10–15 m) up in pine or larch trees; the nest trees were sometimes isolated in open areas, but more often were on the very edge of forest or within 70 m (once 300 m) of the forest edge (Ryabtsev 1984a). Eggs are laid from the second half of April to the beginning of May, although late or substituted clutches may be laid up to the middle of May; the eggs hatch from the end of May to the middle of June, and the young from 12 nests studied in 1982 left the nest between 3 and 23 August, mainly between 6 and 14 August (Ryabtsev 1984a). The usual clutch consists of two eggs, more rarely one to three, exceptionally four (Popov 1984). In Xinjiang, the breeding season starts from April, the birds usually nesting c. 10–25 m above the ground in tall trees in open areas and rarely on cliffs; two or three nests are sometimes built before one is chosen (Zheng Shengwu 1994). Two eggs are laid from mid-April to early May, incubation lasts for 43–45 days, and the chicks fledged in c. 55–77 days, becoming independent in October (Zheng Shengwu 1994).

Far to the south, a small isolated population once bred in Pakistan (information here conflated from Eates 1940–1950, Roberts 1991–1992). Four nests in the Baluchistan hills (Hab valley and Kalat) were sited along broad stony valleys, and all were situated atop stunted thorn trees growing out of crags and cliffs. Two nests contained two eggs in February and November 1944, while a third near Moidan lake contained one egg in March 1946; both sexes contributed to incubation and it was principally the female that fed the young while the male did the hunting. The adults were rather timid, merely circling around when their nest was being robbed.

Migration In most parts of its range, this raptor is a long-distance migrant, with most of the North-East Asian breeding population shifting south into the Indian subcontinent and China for the winter. A recent satellite-tracking project has added considerably to knowledge of the migratory movements of the eastern population. Two juvenile birds hatched in Pribaykal'skiy National Park in Russia in summer 1998 were tracked from there to China; one of them migrated through Mongolia to Inner Mongolia, where its transmitter ceased signalling in early December, and the second bird also moved through Mongolia into China, where it moved southwards through Shaanxi, Gansu and Sichuan provinces during November, and arrived in Yunnan in late November, remaining there (but also ranging into adjacent parts of eastern Myanmar and northern Thailand) throughout the winter (M. J. Ueta *in litt.* 1999, V. V. Ryabtsev *in litt.* 2000; see Remarks 5).

Observations on the south-western shore of Baikal lake, where there is a mass autumn migration of birds of prey, showed that Imperial Eagle migrated through there between 4 and 15 October (Ryabtsev *et al.* 1991). The species is mainly a passage migrant in Nepal, recorded in two vague pulses, the first in September–November, the second in March–May, with a few individuals remaining between these dates (Inskipp and Inskipp 1991). Between 20 October and 7 November 1985, nine (three adults, three immatures and three juveniles)

passed west over the Kali Gandaki valley along with several other species of migrating raptor (de Roder 1989; see Fleming 1983). In Pakistan, it is largely a winter visitor (Roberts 1991–1992), and it visits the plains of northern India in the “cold-weather months”, returning northward to its breeding grounds in April (A. Anderson 1871a). A passage of 40 eagles in one day noted at Jathingri in the Himalayas, 9 November 1923, consisted of some immature Imperial Eagles and the remainder were probably adults, although the possibility that they were adult Greater Spotted Eagles was not ruled out; interestingly, the direction of migration was east-north-east to west-south-west (Donald 1924; see Fleming 1983). Extreme dates in Dera Ismail Khan district, NWFP, were 4 October to 2 April, although one immature bird was observed in August (Kylänpää 2000). In eastern Russia, the first migrants arrive in Predbaykal’ye in late March or early April (Sonin and Lipin 1980).

THREATS Despite the huge range of this eagle, its population has declined significantly everywhere as a consequence of changing land-use practices, pesticides, persecution and declining prey (Heredia 1996). Its long-term survival will depend on the protection of sufficient natural habitat, especially in the breeding range, and control of hunting, particularly in the wintering range. Outside the Asian region it is threatened primarily by the replacement of native forest with exotic species, the removal of large trees under unsympathetic forestry regimes, and the destruction of lowland forest; other contributory factors are loss and alteration of feeding habitats, human disturbance of breeding sites, nest-robbing and illegal trade, shooting, poisoning, shortages of prey species and electrocution by power-lines (Heredia 1996). These threats also frequently occur in the Asian region, the most prevalent being habitat loss, hunting, shortage of prey, disturbance and chemical poisoning. In all cases, the scale of threat is magnified by the low densities at which the species lives (and, therefore, the large size of breeding territories), and its highly migratory nature, factors which mean that viable breeding populations cannot be conserved by protected areas alone, and which reduce the efficacy of the protected area approach in general.

Habitat loss Russia In Predbaykal’ye in eastern Russia, the number of Imperial Eagles declined up until the early 1980s mainly because of the ploughing up of their steppe habitat, which reduced the availability of its main prey species, the Siberian suslik (see Food). Nest failures there were found to be more frequent in territories which contained significant areas of fields and pastures (Ryabtsev 1989). Numbers halved in the Balagansk-Nukutskaya forest-steppe between 1964 and 1981, probably because of the widespread ploughing of steppes around the forested areas (Ryabtsev 1984b). In recent years the ploughing of steppes has ceased, and in some areas uncultivated fields are reverting to steppe; currently, the main threat is the cutting of the last large trees required by this species as nest sites in forest-poor areas (V. V. Ryabtsev *in litt.* 1997). The reasons for declines in numbers in Priol’khon’ye and at Ol’khon island since the 1960s are unclear: habitats have not been damaged there, the supply of food remains rich, pesticides are not used, and the local people do not persecute the species, but in recent years increasing numbers of tourists drive through the nesting territories and perhaps some of these newcomers shoot the eagles (Ryabtsev 1995). However, it is more likely that there have been some unfavourable changes at the wintering sites in China (V. V. Ryabtsev *in litt.* 1997). On the east bank of the Bratsk reservoir north-west of Irkutsk, the forests have been seriously damaged by wood-cutting and fires, and about half the total area of steppe has been ploughed (V. V. Ryabtsev *in litt.* 1997). Conversion of steppes was the main reason for the decline that occurred until the early 1980s throughout Predbaykal’ye, and more recent ploughing and overgrazing has caused serious erosion problems there (V. V. Ryabtsev *in litt.* 1997). The forests continue to be damaged by grazing cattle and wood-cutting for tourists’ fires, and pesticides are probably used in the fields since the steppelands remain the property of collective farms and private individuals and are thus exposed to uncontrolled pressures (V. V. Ryabtsev *in litt.* 1997).

South Korea The wintering area in the wetlands at Yongam lake in the Haenam region has largely been reclaimed and degraded; the national government's Rural Development Corporation is currently preparing a "master-plan" for this area, which implies new pressures in the form of, e.g., road and drain construction (N. Moores *in litt.* 1999).

China The breeding population in north-west China is probably being affected by habitat loss and degradation (Zheng Shengwu 1994). Logging is a serious threat in the sparse forest zones of the Tien Shan and Altai mountains, and the grasslands are being degraded by high densities of domestic livestock; free-ranging goats are a particular problem, as they eat the natural vegetation, preventing regeneration, and cause erosion with their hooves (MacKinnon *et al.* 1996). The sinking of boreholes to supply water to domestic herds has led to adjacent severe land erosion and generally lowered water-tables (MacKinnon *et al.* 1996). In Hong Kong, its habitat is being lost through the development of fishponds (HKBWS *in litt.* 1997). In Taiwan, Kenting National Park is the only non-breeding site that is protected, and economic developments elsewhere could reduce suitable habitat for this species (Yao Chengte *in litt.* 1997).

South and South-East Asia The conversion of open country land to agriculture and the general reduction in prey through disturbance, overgrazing and exploitation by a burgeoning human population have resulted in an apparently huge decline in the population of this species wintering in the Indian subcontinent (Samant *et al.* 1995; see Population) and probable declines in South-East Asia (Duckworth *et al.* 1999). The loss of trees in many semi-desert areas (such as those of Gujarat and Rajasthan) has resulted in a lack of suitable hunting and roosting perches for this species and various other raptors (Samant *et al.* 1995). Raptors are increasingly noted using man-made constructions such as pylons and power-cables for these purposes, and this habit occasionally causes mortalities (Samant *et al.* 1995). Koning (1976) pointed to "deforestation, drainage of marshes, land use and the use of pesticides" as the fundamental causes of the large declines in raptors reported in Pakistan. An account of general threats to raptors in South and South-East Asia, especially in aquatic environments, appears under Pallas's Fish-eagle and Greater Spotted Eagle; an account of potentially deleterious changes (principally conversion to agriculture) in desert regions of north-west India and west Pakistan appears under Great Indian Bustard *Ardeotis nigriceps*.

Persecution This species is apparently hunted for its feathers in mainland China (Zheng Shengwu 1994), and it is threatened by heavy persecution almost throughout its Asian range, perhaps especially on the South-East Asian wintering grounds (see Thewlis *et al.* 1998, Duckworth *et al.* 1999). For example, various species of raptor are hunted in Laos, primarily for food, and both dead and live specimens, the latter often kept as pets, are traded in urban markets (Baird 1993). In addition, the claws of raptors are used in traditional medicine (Martin 1992).

Prey shortage A reduction in food resources is thought to have been a deleterious influence on populations of this eagle. **Russia** In Priol'khon'ye in eastern Russia, three inhabited nests studied in July 1993 appeared to have been unsuccessful, possibly because an unknown disease had reduced the numbers of their main prey species, the Siberian suslik; in 1996, chicks were successfully fledged from two of these three nests (Ryabtsev 1995, V. V. Ryabtsev *in litt.* 1997). **South Asia** The over-exploitation of wildfowl has presumably reduced food resources for this raptor (see equivalent section under Pallas's Fish-eagle). Prey species in the desert regions of Rajasthan and Gujarat are declining through intense poaching pressure even in protected areas (Samant *et al.* 1995).

Disturbance **Russia** Some breeding territories in eastern Russia are subject to heavy tourist pressure, particularly some forest territories and those near lakeshores, and this is likely to have caused the desertion of some nests (V. V. Ryabtsev *in litt.* 1997). Accounts of disturbance at wetlands in Pakistan, India, Nepal, Bangladesh, Myanmar, Thailand, Laos, Cambodia and Vietnam are in Threats under Greater Spotted Eagle and Sarus Crane *Grus antigone*.

Pollution Although direct data showing the effects on aquatic ecosystems of high doses of toxic chemicals and pesticides are scant in Asia, the position of this raptor high in the food chain suggests that it is very likely to suffer—either through reduced prey populations or an accumulation of poisons, or both—from the widespread and liberal application of agricultural chemicals (e.g. persistent organochlorines) in the region (see equivalent sections under White-winged Duck *Cairina scutulata* and Pallas's Fish-eagle). It is reasonable to assume that the pesticides and poisons so commonly used by farmers and generated by industries in Asia accumulate in the eagle's prey and contribute to the pressure on its populations. *Russia* There is much indirect evidence from eastern Russia that pesticide poisoning is affecting this species (and other birds of prey). In the early 1980s, 26 of the 38 nests (c.68%) studied in Predbaykal'ye were successful; of the unsuccessful nests, the eggs failed to hatch in four (two of which proved to contain unfertilised eggs), eggs were not laid in three nests despite repeated observations of copulation, two newly hatched broods (which hatched unusually late) perished in the nest, and two were destroyed by natural events (flooding by a storm and desertion because of red forest ants) (Ryabtsev 1989). A pair monitored there between 1983 and 1996 nested annually but failed to rear a single chick (V. V. Ryabtsev *in litt.* 1997). The Ratcliffe index (see Ratcliffe 1967) was used to compare the shell-thickness of nine eggs collected there in 1962–1967 with nine infertile eggs collected in 1981–1983, and it was found that the shells of the infertile eggs were up to 12.5% thinner than average (Ryabtsev 1989). The proportion of unfertilised eggs was found to be much higher on the Balagansk-Nukutskaya forest-steppe (c.63%) than in Priol'khon'ye (c.23%) (Ryabtsev 1989). On the Balagansk-Nukutskaya forest-steppe, in addition to the large number of infertile eggs, there have been delays in nesting, an inability to lay eggs, decreases in eggshell thickness and developmental anomalies and early mortality in nestlings; these phenomena are presumably linked to the relatively large areas of fields in that region (in comparison with Priol'khon'ye and Ol'khon island) which are treated with pesticides (V. V. Ryabtsev *in litt.* 1997). The pesticides are used mainly to control butterflies, which proliferated when the steppes were converted to fields, but in recent years the use of pesticides has decreased because of their high price (V. V. Ryabtsev *in litt.* 1997). *China* Pesticides used to control rodents are believed to be a problem for this eagle (Zheng Shengwu 1994). In Hong Kong, the possibility of secondary poisoning through ingestion of rodent poisons commonly used around feed stores, etc., is a real concern (HKBWS *in litt.* 1997). *India* The wetlands at Keoladeo National Park are threatened by an erratic water supply (Samant *et al.* 1995), contamination by industrial effluents and the run-off of pesticides from nearby farmland (see Muralidharan 1992, Ramachandran and Vijayan 1994). Further threats (in particular the problem of pollution) in Keoladeo and Sultanpur National Parks, India, are outlined in the equivalent section under Sarus Crane. *Thailand* In Thailand a wintering individual was caught by a villager in 1987 because it was too sick to fly after eating a poisoned rat (D. Ogle *in litt.* 1987).

MEASURES TAKEN In Europe and Central Asia this species is legally protected in Azerbaijan, Bulgaria, Croatia, Georgia, Greece, Hungary, Romania, Slovakia, Turkey, Ukraine and Yugoslavia (Heredia 1996). It breeds in protected areas in Azerbaijan, Georgia, Hungary, Romania, Russia, Slovakia and Turkey, populations in Bulgaria, Hungary and Slovakia are monitored, the Eastern Imperial Eagle Working Group was established in 1990, and an international action plan was published in 1996 (Heredia 1996). Measures taken in the Asian parts of its range are given in detail below.

Legislation The Imperial Eagle is listed on Appendix I of the CMS (Bonn Convention, for which see Boere 1991). It is also listed on Appendix I of CITES. It is legally protected in Russia, a nationally protected species (First Class) in China, and a protected species in Taiwan and South Korea; it receives general protection in India, Myanmar and Thailand.

Protected areas The Imperial Eagle is highly mobile and therefore its occurrence in many protected areas is intermittent or based on single records only. It should be borne in mind,

therefore, that the following list of protected areas from which it has been recorded probably contains many sites that contribute little to its conservation. *Russia* In eastern Russia, the breeding territories at Priol'khon'ye and Ol'khon island are inside Pribaykal'skiy National Park, which was established in 1986 (V. V. Ryabtsev *in litt.* 1997). The breeding territories in Tunkinskaya valley are inside Tunkinskiy National Park, which was established in 1990 (V. V. Ryabtsev *in litt.* 1997). However, these reserves do not provide very effective protection to this species and its habitats, as many of the areas where it hunts are the property of collective farms or private individuals, human pressure (e.g. recreational activities) is not regulated within territories, and there are no special protection measures for it (V. V. Ryabtsev *in litt.* 1997). *China* In mainland China, this species is recorded from the following protected areas: Changbai Shan Nature Reserve in Jilin; She Dao-Laotieshan Nature Reserve in Liaoning; Dalai Hu National Nature Reserve in Inner Mongolia; Niao Dao Nature Reserve in Qinghai; Qilian Shan Nature Reserve in Gansu; Cao Hai Nature Reserve in Guizhou; Song Shan National Nature Reserve in Hebei; Qingdao Bird Nature Reserve and Changdao Nature Reserve in Shandong; Yancheng Nature Reserve in Jiangsu; Poyang Lake Nature Reserve in Jiangxi. In Hong Kong it is recorded in Mai Po Marshes Nature Reserve, and in Taiwan it is known from Kenting National Park (Liu Donglai *et al.* 1996, see Distribution). *South Asia* In Pakistan it has been recorded in Drigh Lake Wildlife Sanctuary. In India, records are from the following national parks: Corbett, Desert, Dudwa, Kaziranga, Keoladeo, Manas and Sultanpur. It has also been reported from the Kugti, Nalsarovar, Tundah and Vedanthangal Sanctuaries, and Sariska Wildlife Sanctuary. In Nepal, it is recorded from Kosi Tappu Wildlife Reserve, Makalu Barun Conservation Area, Royal Chitwan National Park and Sagarmatha National Park. *South-East Asia* In Thailand, it is recorded with some regularity from Khao Sam Roi Yot National Park, and in Vietnam there are records from Cuc Phuong and Tam Dao National Parks.

Research and education *Russia* The population and ecology of this species have been intensively studied in its breeding range in eastern Russia (Ryabtsev 1983, 1984a,b, 1985, 1989, 1995, Ryabtsev *et al.* 1991). A recent satellite-tracking project has added considerably to knowledge of the migratory movements of the eastern population, by tracking two birds from the breeding grounds in Russia through Mongolia to China (M. J. Ueta *in litt.* 1999; see Remarks 5). In Laos, posters produced by the WCS Lao/CPAWM cooperative project include information relating to the beneficial role of raptors in controlling crop pests (J. W. Duckworth *in litt.* 1999). As such they might succeed in reducing hunting levels in some areas.

MEASURES PROPOSED As this species is currently a victim of changing land-use practices, increasing human disturbance of natural habitats, hunting, and excessive use or by-production of toxic chemicals by agriculture or industry, its status will only be improved by the control and reversal of these threats.

Control of pollution, persecution and disturbance The widespread use of pesticides in Asia appears to be reducing the breeding success of this species (and of other birds of prey), and the improved control of their use throughout the region is an important conservation issue for the ecosystem in general, but particularly for predators in which these toxins accumulate (see Threats). Although it has been proposed that better controls on pesticide use (including a ban on most dangerous pesticides) is required in the breeding range (V. V. Ryabtsev *in litt.* 1997), this clearly applies throughout the Asian range as pesticides ingested on the wintering grounds will also affect reproductive success and survival. Industrial effluents should be controlled and farmers encouraged to use organic pesticides instead of organochlorines (Samant *et al.* 1995; see equivalent section under Sarus Crane). Disturbance should be controlled in key breeding areas of the species, and nest sites directly protected if necessary. Improved control of hunting and trapping of raptors is required in many Asian countries for their long-term conservation. Bans are needed on keeping the species in captivity, and on

selling its skins in Russia (V. V. Ryabtsev *in litt.* 1997). In areas of India that support wintering populations, such as the semi-deserts of Gujarat and Rajasthan, measures are required to reduce hunting of large raptors and their prey (Samant *et al.* 1995).

Protected areas Given the species's spatial requirements, protected areas need to be as large as possible, particularly on the breeding grounds. Apart from the universal need to strengthen the institutions responsible for site protection (see Measures Proposed under White-winged Duck), the following measures are necessary. *Russia* Plans to create a game reserve for the protection of this and other species on the east bank of Bratsk reservoir (the Angara river) have been discussed since the 1980s, but have not yet been implemented because of a lack of funding (V. V. Ryabtsev *in litt.* 1997). In Pribaykal'skiy National Park, jurisdiction over all relict steppes in Priol'khon'ye and on Ol'khon island must be transferred to the park (most likely by paying their current owners); areas should be established within this reserve with special protective measures for rare species of bird and animal (V. V. Ryabtsev *in litt.* 1997). In Pribaykal'skiy and Tunkinskiy National Parks, reserved zones are needed around the nest sites of this species, with a new protected area in the Barguzinskaya valley (V. V. Ryabtsev *in litt.* 1997). *China* Au-ku wetlands in southern Taiwan should be established as a nature reserve (Yao Chengte *in litt.* 1997). In Hong Kong, the areas around Mai Po and at Tsim Bei Tsui need better protection (HKBWS *in litt.* 1997). *South Asia* As Pakistan is an important country for large raptors (Koning 1976), efforts should be made to protect important sites, ideally where the ranges of this species, Pallas's Fish-eagle and the Greater Spotted Eagle overlap. Some of the best habitat for this species survives in Gujarat and Rajasthan (areas such as Wild Ass National Park and Desert National Park); these should be afforded the best possible protection, with hunting eliminated and a total ban imposed on tree-cutting activities (Samant *et al.* 1995; see also Measures Proposed under Great Indian Bustard). Work needed at Keoladeo National Park (currently the single most important site for the species in its Asian wintering range) is outlined under Sarus Crane. *South-East Asia* Protection of Khao Sam Roi Yot National Park, Thailand, is required (see equivalent section under Greater Spotted Eagle). In Indochina effective protection of open-country or open-woodland habitats is needed, ideally including Dong Khantung proposed NBCA and Xe Pian NBCA in Laos (see Duckworth *et al.* 1999), a concerted conservation programme in northern Cambodia (see Measures Proposed under White-shouldered Ibis *Pseudibis davisoni* and Bengal Florican *Houbaropsis bengalensis*), and establishment of extensive protected sites in southern Vietnam, including the Mekong delta region.

Research The breeding range in China and Mongolia is poorly known, and surveys are required. The non-breeding range in all Asia is poorly understood, and again surveys are required to identify new wintering sites, with a view to prioritising key areas for protection. Areas where the species is known to winter should be censused and monitored regularly to identify trends and highlight threats. A regular national winter census should be instituted in India (and, if possible, Pakistan). Winter surveys of the Xiang Khouang plateau in Laos should aim to clarify the current status of this species in the area (Duckworth *et al.* 1999). The winter ecology of this raptor needs elucidation: for example, in Yunnan it is important to clarify the altitudinal limits of wintering birds, what they feed on, and the factors which may cause mortality (V. V. Ryabtsev *in litt.* 2000). The identification of this and other *Aquila* eagles is problematic (see Remarks 1), and a fuller dissemination of modern identification literature is needed (ideally in national languages).

Education Publicity campaigns in important areas for this species could be used to try to control hunting, habitat destruction, pesticide use and other threats. In both the breeding and wintering ranges, campaigns are needed to publicise the importance and endangerment of this species (see Measures Taken) and to promote its protection. The customs and traditions of the Buryat people, who are sympathetic to nature conservation, should be supported and revived (V. V. Ryabtsev *in litt.* 1997).

REMARKS (1) The identification of this species and other *Aquila* eagles is occasionally difficult, and it is therefore possible that some of the sight records (and even some specimen records) listed in under Distribution involved misidentifications (see, e.g., Harris *et al.* 1989). Efforts have been made here to eliminate all records where there appeared to be any uncertainty. Listings for many Indian protected areas by Samant *et al.* (1995) were perhaps hypothetical and are therefore discounted (see Remarks 7 under Pallas's Fish-eagle *Haliaeetus leucoryphus*). As Ali and Ripley (1968–1998) remarked, “in view of past misidentifications, old breeding records [are] not completely trustworthy”. Related to this is the confusion of early taxonomy and nomenclature of *Aquila* eagles (particularly *rapax*, *nipalensis*, *heliaca* and *clanga*), a factor leading to many mistaken reports. For example, although Beavan (1865–1868, 1868) recorded “*imperialis*” at Ambala, India, in 1866, the separation of Imperial and Steppe Eagles had, as Whistler (1918) pointed out, not been effectively completed at that time and thus this record is dropped. Originally, *Aquila imperialis*, the “European Imperial Eagle” was considered distinct from two forms of “Indian Imperial Eagle”: *A. crassipes* and *A. bifasciata* (Brooks 1873). *A. imperialis* and *A. crassipes*, and another form *mogilnik*, are now joined under *A. heliaca*, while *bifasciata* has been separated as (an age class of) Steppe Eagle *A. nipalensis* (see, e.g., Brooks 1872a,b, Peters 1931–1987). Sighting entries such as “*Aquila nipalensis* The Eastern Imperial Eagle” (Davidson 1887) or “*Aquila mogilnik* The Imperial Eagle” (Reid 1887) were common, illustrating the ample scope for confusion in early references. Again, records that are open to doubt have been omitted.

(2) Swinhoe (1882) described the species as “common all through the winter” at Kandahar, southern Afghanistan; it is therefore rather surprising that there are no records of it in adjacent Baluchistan except Murray's statement (Ticehurst 1926–1927) that “Dupuis collected several at Quetta on 2 May 1880 and 7 July 1888”. There have, in fact, been several subsequent records from the state, and thus, despite Ticehurst's (1926–1927) suspicion that these early reports were mistaken, they are accepted here. Ticehurst (1930) also urged caution as regards Baluchistan breeding records, stating “it is said to build in trees; if so, I can imagine no place less likely to attract it”; nevertheless, a small breeding population was later confirmed (Eates 1940–1950, Roberts 1991–1992).

(3) Proud (1955) and presumably hence Biswas (1960–1966) actually listed wintering eagles in the Nepal valley as this species, although her description (“a very dark eagle, almost purple-black in colour with short vulture-like tail and broad stiff wings”) indicates that they were probably Greater Spotted Eagles *Aquila clanga*.

(4) Two specimens in the University of Hanoi were apparently collected near the city in 1940, one specimen labelled March (Nguyen Cu *in litt.* 1997).

(5) This satellite-tracking research by M. J. Ueta (see Distribution and Ecology) not only shed light on the considerable mobility of the species and the timing of its movements, but also pointed up the level of ignorance of its distribution and the ease with which large eagles go unnoticed. A glance at the distributional map reveals that the “unnamed locality” data generated by this project makes up a considerable proportion of current knowledge regarding the distribution of the species in China and Mongolia, not to mention the inclusion of two new districts and one new country within its range.