

Threatened Birds of Asia:

The BirdLife International Red Data Book

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DALMATIAN PELICAN

Pelecanus crispus

Conservation Dependent

This species was formerly listed as Vulnerable. However, conservation measures have resulted in a population increase, particularly at the largest colony at Lake Mikri Prespa, such that the species no longer qualifies as threatened. The cessation of conservation measures would probably result in the species qualifying as threatened within five years and it is therefore listed as Conservation Dependent.



DISTRIBUTION The Dalmatian Pelican (see Remarks 1) occupies a wide, fragmented range from Yugoslavia, Greece, Albania and Turkey in the west to China in the east, and south to the Indian subcontinent.

Outside the Asian region It has a fragmented breeding range in eastern Europe and east-central Asia, breeding in Yugoslavia, Albania, Greece, Romania, Bulgaria, Russia, Ukraine, Azerbaijan, Armenia, Turkey, Iran, Turkmenistan, Uzbekistan and Kazakhstan (Crivelli 1996). European breeders winter in the eastern Mediterranean while Russian and Central Asian breeders winter in the Middle East and the Indian subcontinent (Crivelli 1996, Mix and Bräunlich 2000); further information on distribution and status in this part of the species's range is given elsewhere (e.g. Cramp and Simmons 1977, Tucker and Heath 1994, Crivelli 1996, Heath *et al.* 2001, Mix and Bräunlich 2000).

Asia region There were breeding records of the species in Xinjiang, western China, in the early twentieth century, but this population is believed to be extinct (Scott 1989), and the only remaining "Asian" breeding population is in far western Mongolia. It was formerly a relatively numerous passage and winter visitor to northern and eastern China, but it declined substantially during the twentieth century and it now winters in small numbers at just a handful of localities in south-eastern China. It is a rare non-breeding visitor (or vagrant) to eastern Russia, Japan and South Korea. In the Indian subcontinent it occurs as a winter visitor to central and southern Pakistan and western and northern India (Roberts 1991–1992, Grimmett *et al.* 1998). There are no confirmed records for Bangladesh, Sri Lanka, Myanmar or Vietnam (see Remarks 2).

■ **RUSSIA** This species is a rare non-breeding visitor to eastern Russia, with records as follows:

■ **Krasnoyarsk** near **Yeniseysk**, lower Angara river, one collected, undated (Tugarinov and Buturlin 1911 in Rogacheva 1992); 35 km from **Krasnoyarsk**, one collected, May 1907 (Tugarinov and Buturlin 1911 in Rogacheva 1992); Yenisey river, 10 km north of the Podkamennaya Tunguska river mouth, one young bird captured, probably of this species, October 1970 (Rogacheva 1992).

■ **MONGOLIA** All records of this species in Mongolia are from the central to western regions of the country, and the easternmost record (at Ogii Nuur) is more than 300 km west of Ulaanbaatar. It currently only breeds in far western Mongolia at Airag Nuur in Uvs province; it formerly did so at Khar Us Nuur in Khovd province. It is a scarce migrant elsewhere, with records (by province) from: ■ **Uvs** "Uvs", presumably at **Uvs Nuur** lake, one bird in 1985 (Bold 1997); **Khyargas Nuur** (Hyargas Nuur) lake, 10 birds in 1976 (Bold 1997), two adults, June 1995 (A. Bräunlich *in litt.* 2000); **Ayrag Nuur** lake, listed as a Ramsar site in April 1999 (data from Ramsar Bureau Information Sheet), 19 adults and five occupied nests, June 1995 (A. Bräunlich *in litt.* 2000), 23 adults and 2–3 occupied nests, and probably a fourth unoccupied

nest, June 1998, five adults and two juveniles, September 1998 (C. Liegl *per* A. Bräunlich *in litt.* 2000), 24 adults and 9–10 occupied nests, June 1999 (U. Koeppen *per* A. Bräunlich *in litt.* 2000), 14 adults, eight nests and seven pulli, one nest with a dead pullus, two nests with clutches of one and two eggs, July 1999 (H. Mix *per* A. Bräunlich *in litt.* 2000), eight young birds and three of unknown age, August 1999 (C. Liegl *per* A. Bräunlich *in litt.* 2000); ■ **Khovd Chono Kharakh river delta**, Khar Nuur, one adult, June 1995 (A. Bräunlich *in litt.* 2000); **Khovd river delta**, Khar Us Nuur, two adults, June 1995 (A. Bräunlich *in litt.* 2000); **Khar Us Nuur** (Har Us lake, Khar Us lake, Char-us-nuur), at Shuvuun Tsuglaan, where over 300 birds were seen in summer 1956, 207 in 1972 and 13 in 1981 (Bold 1997), with a breeding colony reported by Mongolian ornithologists although only a few birds were seen flying high over the lake in June 1974 (Piechocki *et al.* 1981), c.40 pairs breeding in 1976 (Ostapenko *et al.* 1977 in Crivelli and Vizi 1981; also Bold 1997), up to 23, July–August 1992 (C. Bealey *in litt.* 1999), but the colony long since deserted and just a few birds occurring there from time to time (A. Bräunlich *in litt.* 2000); **Bayan Nuur** (Bayan lake), “immature birds may occur”, undated (Bold 1997); eastern side of Agwash swamp (untraced), one adult, June 1995 (A. Bräunlich *in litt.* 2000); ■ **Dzavkhan Oigon Nuur lake**, 13 birds in 1976 (Bold 1997); **Dzavkhan river** (Zavkhan river), on migration (unspecified years) (Bold 1997); ■ **Arkhangai Ögiy Nuur lake**, “immature birds may occur”, undated (Bold 1997); ■ **Bayankhongor Boon Tsagaan Nur** (Buncagan lake), 120 km north-west of Orog Nuur, Piechocki (1968) judging that the breeding population from Orog Nuur had been displaced to this lake, undated (Crivelli and Vizi 1981); **Kholobolchi Nor** (Kholbooj lake), 50 birds, autumn 1979 (Bold 1997); **Orog Nuur** (Orok lake), recorded in 1926 (Kozlova 1932–1933), three, April–May 1977, with scarlet bills typical of breeding birds, but no evidence of breeding (Kitson 1978); **Tatsain Tsagaan Nuur** (Taatsing Tsagan Nor) lake, six, May 1977 (Kitson 1978).

■ **JAPAN** This species is a rare visitor, which may have been more numerous in the past as ancient drawings indicate that it probably occurred at Omi on Lake Biwa, at Settsu and Yamashiro in the Hyogo-Osaka area and at Tokyo (Austin and Kuroda 1953). Records (by island and prefecture) are from:

Honshu ■ **Ibaraki Hi-numa lake**, immature (probably the same bird as in Ishikawa and Shizuoka), winter 1998/1999 (Morioka 1999, K. Kato verbally 1999); ■ **Chiba Gyotoku**, September–October 1968 (OSJ 1974); ■ **Ishikawa Nanao bay**, Tatsuruhama-machi, Kashimagun, immature (probably the same bird as in Ibaraki and Shizuoka), November 1998 (Morioka 1999); ■ **Shizuoka Fuji-gawa river mouth**, immature (probably the same bird as in Ibaraki and Ishikawa), winter 1998/1999 (Morioka 1999); ■ **Shimane Shinji-ko lake**, subadult, April 1998 (Wakisaka and Notsu 1999); ■ **Yamaguchi Ajisu**, one (probably the same bird as on Ishigaki-jima island: see below), April 1998 (Wakisaka and Notsu 1999; see Remarks 3);

Kyushu ■ **Fukuoka Imazu-son, Itoshima-gun**, November 1941 (Kiyosu 1965); ■ **Miyazaki** unspecified localities, undated (OSJ 2000); ■ **Kagoshima Anraku estuary**, three, October–November, 1919 (Uchida 1920);

Ishigaki-jima island, Yaeyama islands, before 1942 (Takano 1981, Brazil 1991), one (probably the same bird as in Yamaguchi), March 1998 (*Birder* 98/5, Wakisaka and Notsu 1999; see Remarks 3); **Tono island** (untraced), Yaeyama islands, undated (OSJ 2000).

■ **KOREA** ■ **SOUTH KOREA** This species is known only by a single record on the Korean peninsula: ■ **Kyonggi and Seoul Incheon** (Chemulpo), immature collected, November 1914 (N. Kuroda 1918).

■ **CHINA** ■ **MAINLAND CHINA** There has been considerable confusion between Dalmatian and Spot-billed Pelican *Pelecanus philippensis* (see relevant account) in China, because many authors have considered *crispus* a subspecies of *P. philippensis* (e.g. Cheng Tso-hsin 1987), and because of misidentification of birds seen in the field and possibly also of specimens (see

Remarks 1). The Dalmatian Pelican has a more northerly distribution, and historical records indicating that pelicans were formerly much more numerous in north-east China presumably related to this species. These included records at Shenyang in Jilin province and Tieling in Liaoning province in the late eighteenth century, and pelicans were apparently common along the Ziya He, Daqing He and Luan He rivers in Hebei province during the Ming to early Qing dynasties (approximately the thirteenth to eighteenth centuries) (He Yeheng 1994). Pelicans reported from Guizhou in 1722 (He Yeheng 1994) could have been either species.

The Dalmatian Pelican bred at Lop Nur in Xinjiang earlier this century, but the population is now presumed to be extinct there (see Scott 1989). It has been recorded on migration in Liaoning, Inner Mongolia, Xinjiang, where it is found in the western Tien Shan mountains and south-west Tarim basin (Yuan Guoying 1991), Qinghai, Ningxia, Shaanxi (where it is reported to remain to moult), Shanxi, Hebei, Tianjin, Beijing, Shandong, Henan, Hubei, Jiangsu, Shanghai, Zhejiang, Fujian, Jiangxi, Hunan, Guangxi, Guangdong and Hainan. The only site where it is known to winter annually is Deep Bay in Hong Kong. However, it was apparently regularly present at Poyang Hu lake in Jiangxi and Dong Dongting Hu lake in Hunan until at least the 1990s, while a flock of 10 found in Wenzhou bay in Zhejiang in 1999 may represent a previously unknown wintering population, and it could also winter on the coast of Jiangsu (in Yancheng Nature Reserve). Records of pelicans believed to be this species are listed (by province) below, but there is a possibility that some of them relate to Spot-billed Pelican, and conversely that some records listed for that species could be Dalmatian Pelicans (see Remarks 1):

■ **Liaoning Zhuanghe estuary**, reported to pause briefly on northward migration along the river, undated (Qiu Yingjie 1998);

■ **Inner Mongolia Ejn Qi**, October 1959 (specimen in ASCN); **Uiansuhai Nur** (Wuliangsuhai) lake, October and November 1960 (two specimens in ASCN), two, April 1986, one, April 1987, late September, 1986/1987 (Yang Guisheng *et al.* 1998, Xing Lianlian *in litt.* 1997, 1998), four, April 1992 (Xing Lianlian *et al.* undated); **Taolimiao-Alashan Nur** lake, April 1990 and 1991 (He Fenqi *et al.* 1996, Xing Lianlian *in litt.* 1997, 1998);

■ **Xinjiang Ulungur Hu** lake, one adult and one juvenile, but no sign of breeding, August 1990 (Dissing *et al.* 1990), seven, September 1997 (Gao Xingyi *in litt.* 1998); **Tacheng county**, undated (Zheng Shengwu 1994); **Dorbiljin** (Emin), undated (Zheng Shengwu 1994); **Chaiwopu Hu** lake, recent sighting (Gao Xingyi *in litt.* 1998, Ma Ming *in litt.* 1999); **Yanqi**, undated (Zheng Shengwu 1994); **Bagrax Hu** lake (Bosten), undated (Zheng Shengwu 1994); **Karaxahar** river (Kaidu He), undated (Zheng Shengwu 1994); **Lop Nur**, formerly the only known breeding site in China (Cheng Tso-hsin 1976 in Scott 1989), but probably no longer (see Threats);

■ **Qinghai Qinghai Hu** lake, undated (Zheng Shengwu 1994);

■ **Ningxia Pingluo county**, undated (Zheng Shengwu 1994); **Qianjin Hu** lake, Pingluo county, June 1964 (Wang Xiangting 1990, specimen in LAUCN); **Huzi Hu** lake, **Yongning county**, undated (Wang Xiangting 1990); **Lingwu county**, undated (Zheng Shengwu 1994);

■ **Shaanxi Hongjian Nur** (Hongjiandiao oasis), Yulin and Shenmu counties, where birds are reported to moult on these 250 small lakes in a 200 km² area, undated (Lu Jianjian 1990; also Zheng Shengwu 1994);

■ **Shanxi Xiaruyue** reservoir, Fanshi county, April 1992 (Su Hualong and Liu Huanjin 1995);

■ **Hebei Xuanhua county** (Suen-Hoa-Fou), one, autumn 1863 (David 1867); **Beidaihe** (Peitaiho), “reported to me two or three times by friends”, undated (Wilder 1924d, Wilder and Hubbard 1924), apparently a rare passage migrant (unspecified years) (Beidaihe Bird Society 1992), one, September 1997 (P. Holt *in litt.* 1999); **Shijiutuo** (“Happy island”), south of Beidaihe, one, May 1996 (H. Jännes *per* P. Holt *in litt.* 1999);

■ **Tianjin** near **Tianjin** (Tientsin), one, autumn 1863 (David 1867), one collected, October 1933 (Seys and Licent 1933–1934 in Hemmingsen and Guildal 1968); **Beidagang** reservoir, five, January 1991 (Waterbird Specialist Group 1994);

■ **Beijing Beijing**, male collected at Lugouqiao (Lu Kou Ch'iao or Marco Polo's Bridge), c.25 km south-west of Beijing, almost certainly this species, April 1934 (Hemmingsen and Guildal 1968), one collected at "Hsinan", October 1934, "30 years ago breeding in Peking according to local residents" (Shaw 1936 in Hemmingsen and Guildal 1968), one reported to have landed in Tiananmen Square and been captured, September 1988 (*Oriental Bird Club Bull.* 10 [1989]: 4–9), one flying over Tiananmen Square, September 1997 (P. Holt *in litt.* 1999); **Nanyuan** (Nan Hai-tze, Nanhaizi or old Imperial Hunting Park), south of Beijing, two collected, June 1924 (Wilder 1924d, Wilder and Hubbard 1924; also Gee *et al.* 1926–1927, Sowerby 1943);

■ **Shandong Qingdao**, "rare", undated (Liu Daiji *et al.* 1994), with a specimen examined in Qingdao city reported to have been collected in Shandong province, undated (Lefevre 1962; see Remarks 4);

■ **Henan Pangzhai** (old channels of the Yellow River in northern Henan), two, January 1990 (Waterbird Specialist Group 1994); Taihangshan Macaque Nature Reserve, **Jiaozuo city**, winter visitor, unspecified years (Qu Wenyuan and Song Chaoshu 1996b);

■ **Hubei Chen Hu** lake, Wuhan lakes, undated (Hu Hongxing *et al.* 1996), up to 13 in recent years (Scott 1989); **Hong Hu** lake, March 1957 (Lu Xin *in litt.* 1997, specimen in WUCN), only recorded on passage, unspecified years (Lu Jianjian 1990);

■ **Jiangsu Jiangsu coast** (Yancheng coast), 21, January 1991 (Waterbird Specialist Group 1994; see Remarks 1); **Sheyang Salt Works**, Yancheng Nature Reserve, five, December 1989–February 1990 (Wang Hui and Du Jinjin 1993), single birds, January 1991 and winter 1991–1992 (Waterbird Specialist Group 1994; see Remarks 1); **Dunmenkou**, Dongtai city (in Yancheng Nature Reserve), six, November 1991 (Waterbird Specialist Group 1994; see Remarks 1); Dongshatan, **Dongtai city** (in Yancheng Nature Reserve), 76 birds (possibly including some of the same birds as at Liulishe and Dunmenkou), November 1991 (Waterbird Specialist Group 1994; see Remarks 1); **Gaoyou Hu** lake, 35 birds, January 1991 (Waterbird Specialist Group 1994; see Remarks 1), but with no subsequent records and human disturbance apparently increasing in the area (SC); **Liulishe**, Dongtai city (in Yancheng Nature Reserve), 32 birds, November 1991 (Waterbird Specialist Group 1994; see Remarks 1); **Tai Hu** (T'ai Hu) lake, undated (Sowerby 1943; see Remarks 4);

■ **Shanghai Shanghai**, two collected at Tonglimiao (T'ung-li-miao district), one in 1923, the other undated (Sowerby 1943; see Remarks 4), March 1931 (three specimens in ASCN, BMNH), undated (La Touche 1925–1934); **Huangpu Jiang** (Huang-p'u) river, one collected "some years ago", and small flocks seen in the upper reaches of this river in unspecified winters (Sowerby 1943);

■ **Zhejiang Shangyu county**, collected, unspecified winter (Zhuge Yang 1990); **Ningbo** (Ningpo), one collected, January (unspecified year) (La Touche 1925–1934; also Zhuge Yang 1990); **Zhuji county**, collected, unspecified winter (Zhuge Yang 1990); **Yueqing county**, collected, unspecified winter (Zhuge Yang 1990); **Wenzhou bay**, Ouhai county, Wenzhou, 10 on saline lakes surrounded by tidal flats, early 1999 (Ding Ping *in litt.* 1999);

■ **Fujian** (Jinmen Dao island is under the administration of Taipei) **Fuzhou** (Foochow), 1897 (two specimens in ASCN), adult female collected at "Lienchiang, near Foochow", April 1913, one collected, December (unspecified year) (La Touche 1917, 1925–1934; also Gee *et al.* 1926–1927) (see Remarks 4), July 1936 (specimen in WUCN; see Remarks 1); Cihu lake, **Jinmen Dao** (Chin-men Tao, Kinmen or Quemoy) island, one, 1996 (CWBF database); **Xiamen** (Amoy), February 1862 (specimen in RMNH);

■ **Jiangxi Poyang Hu Nature Reserve** (Poyang lake), c.25 seen in the 1980s (Lu Jianjian 1990), three flying over Linggong Zhou, December 1985, and one there, January 1986 (Kennerley 1987), five, November 1993 (I. Lewis *in litt.* 1999), only one during an eight-day expedition, December 1997 (Yu Yattung *in litt.* 1998), three, winter 1998/1999 (Zhao Jinsheng and Wu Jiandong 1999); **Dahu Chi**, part of Poyang Hu lake system, 18 seen, December 1985–January 1986 (Kennerley 1987);

■ **Hunan Dong Dongting Hu Nature Reserve** (East Dongting lake), spring 1960, spring 1961, spring 1962 (three specimens in ASCN), recorded in December 1986, fishermen reporting that the species used to be common (Lei Gang *in litt.* 1997), two, January 1988 (Lu Jianjian 1990), three, November–December 1992, but no subsequent records (Lei Gang and Qian Weirong 1998);

■ **Guangxi** unspecified localities, reported to have occurred on “a few occasions in winter”, unspecified years (Vaughan and Jones 1913; see Remarks 1);

■ **Guangdong** Dong Jiang river (East river of the Pearl river), **Huiyang county**, where a female in a taxidermist’s shop was said to have been shot in April (unspecified year) in the Danshui (Tam Shui), Huiyang (Weiyeung district) on the East river (Miller 1931); **Futian Nature Reserve**, Shenzhen bay (Deep Bay), 15 birds, January 1986 (Melville 1986), and indeed an annual winter visitor, involving the same birds that winter in Deep Bay, Hong Kong (SC); **Sanzao Dao** island, Zhuhai city, one killed by a fisherman, undated (Deng Juxie *et al.* 1989), this locality is very close to Macao (SC; see below);

■ **Hainan Dongzhaigang Nature Reserve**, four, January 1987 (Deng Juxie *et al.* 1989), here presumed to be this species (see Remarks 5).

Caldwell and Caldwell (1931) listed an undated record of a Great White Pelican *Pelecanus onocrotalus* being collected at Haikou (Haikao) town (where they also reported Spot-billed Pelican), near Fuqing (Futsing), Fujian, and stated that “the inlet at Hai-kau is a favourite rendezvous and feeding ground for pelican during much of the winter”; however, given the rarity of that species in eastern China (see, e.g., Cheng Tso-hsin 1987), it is likely that some or all of the birds involved were Dalmatian Pelicans.

■ **HONG KONG** This species was first identified in Hong Kong in 1971, since when it has been a regular winter visitor (Chalmers 1986). A similar pattern of numbers and occurrences was established prior to 1971 for birds thought to be Spot-billed Pelican, but there is no satisfactory proof that this species has ever occurred in Hong Kong (Chalmers 1986). It is therefore assumed here that all pelican records in Hong Kong refer to Dalmatian Pelicans, although it is likely that some Spot-billed Pelicans occurred there in the past, when there was apparently a breeding population in south-east China (see Remarks 1). Records are as follows: **Deep Bay**, including sea and tidal flats between Mai Po Nature Reserve and Futian, undated (Vaughan and Jones 1913), c.20 regularly in winter (unspecified years), often roosting on the “Rocky Outcrop” at Mai Po (Herklots 1967), c.40–85 in December–March in the 1960s (maximum of 85, February 1960), c.20–80 in January–March in the 1970s, 70 in early 1981 but otherwise the maximum count in the 1980s being 38 in January 1984, with 10–19 in the early 1990s, three in 1992, 23 in January 1996, 24 in 1997/1998, 21 in 1998/1999 (HKBWS database) and 21 (including only one juvenile), January 2000 (Yu Yat-tung, K. Ng and G. J. Carey *in litt.* 2000); Soko islands, one unidentified pelican, April 1987 (Chalmers 1988).

■ **MACAO** There is a single record that could refer to either this species or Spot-billed Pelican: near Macao (not mapped), April (unspecified year) (Vaughan and Jones 1913; see Remarks 1).

■ **TAIWAN** The species is a rare non-breeding visitor, with records as follows (for records on Jinmen Dao island see Fujian province above): **Chinshan**, Taipei, one, 1993 (CWBF database); **Taipei**, one collected, November 1912 (Kuroda in Lin Wen-horn 1997); **Kangnan**, Hsinchu, one, 1993 (CWBF database); **Litse** (Wu-shih-erh-chia), Ilan county, two, January 1998 (Chiang Ming-liang *in litt.* 1998; see Remarks 3); **Tainan**, one collected, early 1910s (Kuroda in Lin Wen-horn 1997).

■ **PAKISTAN** The Dalmatian Pelican has occurred as a winter visitor from central and southern Pakistan, with records scattered throughout the Indus delta creeks and (mainly) Punjab, Baluchistan and the lower Sind lakes, from August to April (Roberts 1991–1992). Records are from: ■ **North-West Frontier Province Parachinar**, near the Kurram river, a few

shot on migration, February and March, undated (Roberts 1991–1992); ■ **Baluchistan Khushdil Khan lake**, Pishin district, regular flocks of 100–200 stopping over on migration, March–April, 1980s (Roberts 1991–1992); between **Ziarat** and Loralai, several hundred, February 1929 (Stockley 1930); **Zangi Nawar lake**, late March–early April, around 1940 (Christison 1942); **Sonmiani lagoon** (Miani Hor), Lasbela, undated (Ticehurst 1926–1927), six, January 1975 (Scott 1989), 100–150 regularly wintering, 1980s (Roberts 1991–1992); **Pasni bay**, December 1987 (Scott 1989); **Dasht Kaur**, 50, 1987 (Scott 1989); ■ **Sind** Rowajee, near **Sukkur**, regular, around 1871 (Hume 1872–1873); near **Sehwan**, three, January 1872 (Hume 1872–1873); north of Kotri on the Indus, probably in the region of **Hala**, a few scattered individuals, February 1872 (Hume 1872–1873); **Hab dam** (Hub dam), four, January 1987–1988 (Scott 1989), 100, February 1988 (Hirschfeld *et al.* 1988), 25, mid-1970s (Roberts 1991–1992); **Khinjar lake** (Kalri lake), Thatta district, February 1934 (male in UMMZ); **Hadero lake**, 280, January 1987 (Scott 1989), 20–40 regularly wintering in the area (Roberts 1991–1992); east of **Clifton beach**, 30, February 1988 (Hirschfeld *et al.* 1988); **Haleji lake** 40, February–March 1988 (Hirschfeld *et al.* 1988), this population regularly wintering in the area (Roberts 1991–1992); **Karachi bay**, several, February 1872 (Hume 1872–1873); **Phoosani lake**, 16 in the mid-1970s (Scott 1989); **Indus delta**, three, November 1967 (Mountfort and Poore 1968), between Karachi and Ketti Bander in creeks at the mouth of the Indus, regularly seen, February 1972 (Koning and Walmsley 1972), with scattered groups throughout the delta creeks, including 25 on one two-day cruise, mid-1970s (Roberts 1991–1992); Shaikh Kerio Peer, near **Kadhan**, 300, unspecified year (Scott 1989; see Remarks 6); **Muradani lake**, and other sites along the coast, 1963–1965 (Holmes and Wright 1968–1969); Eastern Narra (not mapped), “large flocks”, undated (Doig 1887); ■ **Punjab Kallar Kahar**, c.900 m, one, November 1918, 1921 and 1922, two, 1925 (Waite 1948); **Kharrar jheel**, Sahiwal district, two, October 1971 (Roberts 1991–1992, T. J. Roberts verbally 1997); **Lal Suhanra National Park**, November 1969 (Roberts 1991–1992); around the junction of the Chenab and Sutlej rivers, thus presumably near **Alipur**, three, December 1871 (Hume 1872–1873); **Mithankot**, “numerous”, December 1871 (Hume 1872–1873); between Mithankot and Kashmor, and thus presumably near **Rojhan**, five, December 1871 (Hume 1872–1873).

■ **INDIA** The species is a winter visitor to the country in small numbers; the main influx arrives from the west, while very small numbers are recorded in Assam (Grimmett *et al.* 1998, Choudhury 2000c). Several records initially published or reported as “Spot-billed Pelican” or “*P. philippensis*” have been included in this account, given recent evidence that most recent records of Spot-billed Pelican (see relevant account) in Gujarat are the result of mistaken identity, or taxonomic and nomenclature confusion with Dalmatian Pelican (Parasharya *in press*), thus:

■ **Haryana** Parwali lake, c.12 km from **Sirsa**, two, February–March 1933 (Koelz 1940); Zahidpur, **Rohtak**, undated (Whistler ms); **Sultanpur National Park**, up to 250 in winter, unspecified year (Scott 1989), with several in 1969–1970 (Ganguli 1975), 100, January 1983 (G. Ouweeneel *in litt.* 1999), one, February 1983 (Suter 1983), 15, January 1986 (van der Ven 1987, I. Lewis *in litt.* 1999), one, February 1995 (P. Aström, U. Olsson and D. Zetterström *in litt.* 2000);

■ **Delhi** **Okhla**, one, February 1995 (P. Aström, U. Olsson and D. Zetterström *in litt.* 2000), one, February 1996 (P. Holt *in litt.* 1999);

■ **Rajasthan** Manasarovar, **Sariska Wildlife Sanctuary**, one, January 1990 (Sankar *et al.* 1993); **Keoladeo National Park**, Bharatpur, undated (Abdulali and Pandey 1978), small numbers (up to 50) regular, January–March in the 1980s and 1990s (Hunt 1981, Breeden and Breeden 1982, Calladine 1985, Andersen *et al.* 1986, Cap *et al.* 1986, Gawn 1987, Berlijn *et al.* 1988, P. Holt *in litt.* 1999, G. Ouweeneel *in litt.* 1999); Ban Baretta (Bund Barata, Bandh Baretha) (not mapped), near Bharatpur, two, January 1994 (M. Jäderblad *in litt.* 1994); Gurah Vishnoyia, **Jodhpur**, three, January 1987 (G. Ouweeneel *in litt.* 1999); Banas river, near **Dubi**,

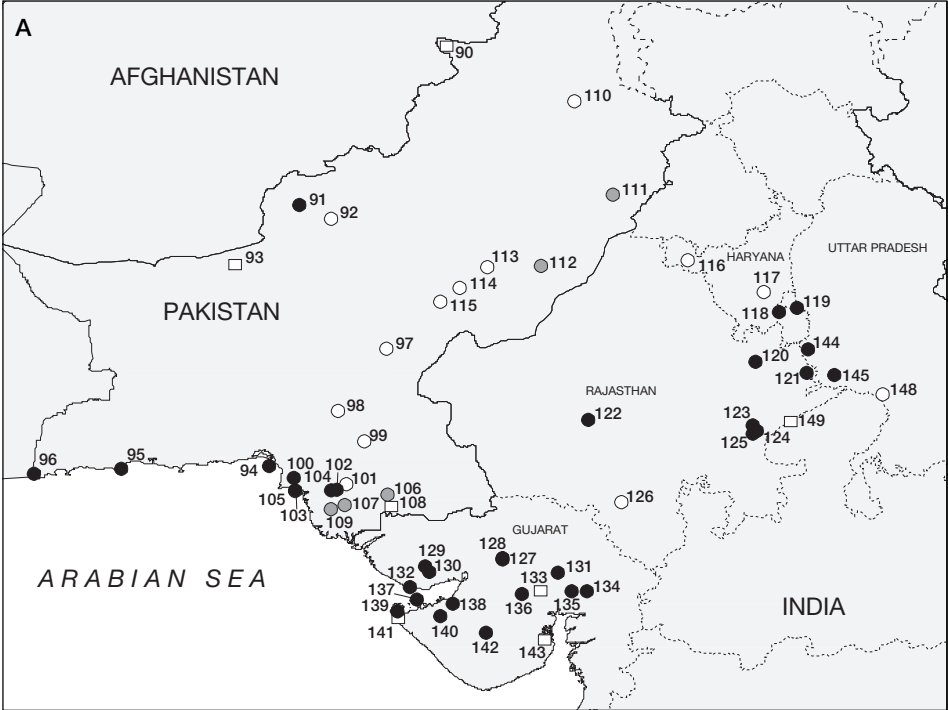
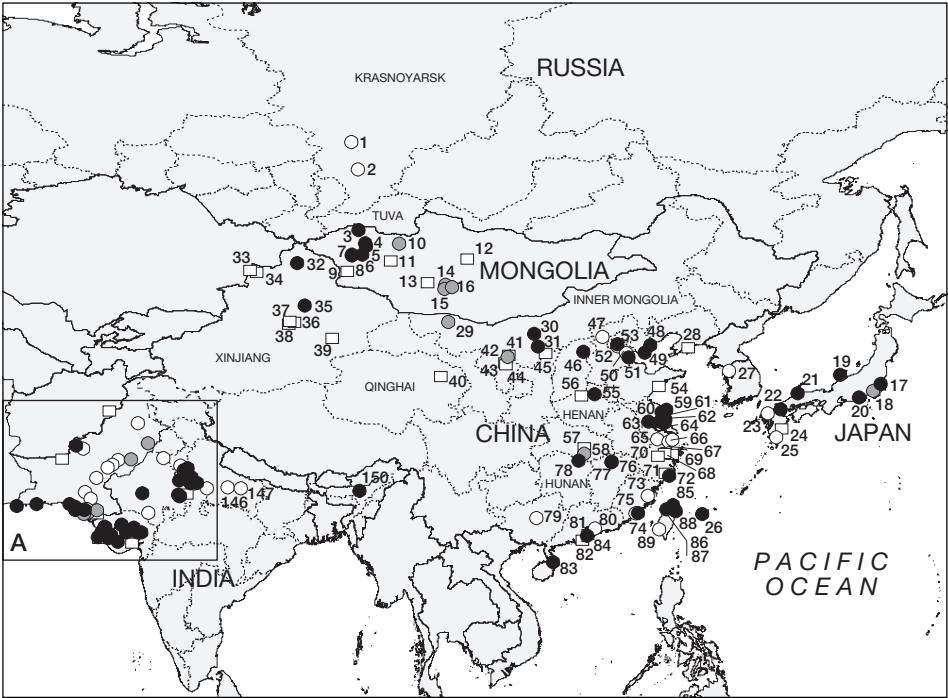
one, December 1998 (Ballard *et al.* 1999); “Ranthambore”, presumably within or near **Ranthambhore National Park**, one, January 1990 (Buckton and Morris 1990); Suriwal lake, near **Sawai Modhopur**, 17, January 1997 (P. Holt *in litt.* 1999), c.120, December 1998 (*Oriental Bird Club Bull.* 29 [1999]: 51–56); “Kunkrowlee”, near **Udaipur**, large flocks in “cold weather”, unspecified year (Hume 1878b);

■ **Gujarat Little Rann of Kutch**, Zainabad, small numbers regularly in winter (B. F. King verbally 1998), including three, January 1999 (A. Prasad *in litt.* 1999); **Wild Ass Sanctuary**, unspecified numbers (as *P. philippensis*), 1989–1992 (Shah *et al.* 1995); Rudramata dam, 14 km north of **Bhuj**, two, December 1987 (Himmatsinhiji 1987); **Chhari-Dhand**, Kutch, 3–9, March–April 1990 (Akhtar and Tiwari 1991, Tiwari 1997); **Thol Lake Sanctuary**, 125 (as *P. philippensis*), January 1996 (AWC data *per* T. Mundkur *in litt.* 1998); Don dam, west of **Mandvi**, four, January 1988 (Himmatsinhiji 1997); **Nalsarovar** (Nalsarovar Sanctuary), up to 100 wintering, undated (Scott 1989); **Kanewal reservoir**, Kheda district, six (as *P. philippensis*), 1987 (van der Ven 1987), regular in winter in small numbers (Parasharya *in press*); **Pariej**, regular in small numbers during winter (Parasharya *in press*); **Surendranagar reservoirs**, eight, January 1987 (Scott 1989), Surendranagar reservoirs, total given as 643 but presumably in error (as *P. philippensis*), 1992 (Anon. 1993); **Gulf of Kutch**, southern shore in Saurashtra, 50, February–March 1984 (Scott 1989); **Khijadia Sanctuary** (Khijadia lakes), 66, February–March 1984 (Gole 1984), 12, January 1996 (AWC data *per* T. Mundkur *in litt.* 1998); **Charakla**, several (as *P. philippensis*), November 1980 (Khacher 1980), at Tata Chemicals, c.30, February 1985 (G. Madge 1986), and Tata Chemicals, a “large number,” February 1997, around 50, end 1997 (Khachar 1998); Arambhada, **Jamnagar district**, five, February 1985 (G. Madge 1986); **Okha Mandal**, listed as *P. philippensis*, undated (Khacher 1980); **Vari Talab**, 25 (as *P. philippensis*), 1991 (Johnson *et al.* 1993); **Bhavnagar**, May 1937 and November 1948 (two in BNHS, Abdulali 1968–1996);

■ **Uttar Pradesh Chhata lakes**, on the border with Rajasthan, three, January 1987 (van der Ven 1987); **Agra**, at the Taj Mahal, six, January 1993 (P. Holt *in litt.* 1999), six, January 1998

The distribution of Dalmatian Pelican *Pelecanus crispus* (maps opposite): (1) Yeniseysk; (2) Krasnoyarsk; (3) Uvs Nuur; (4) Khyargas Nuur; (5) Ayrag Nuur; (6) Chono Kharaiikh river; (7) Khovd river delta; (8) Khar Us Nuur; (9) Bayan Nuur; (10) Oigon Nuur; (11) Dzavkhan river; (12) Ögyi Nuur; (13) Boon Tsagaan Nur; (14) Kholobolchi Nor; (15) Orog Nuur; (16) Tatsain Tsagaan Nuur; (17) Hi-numa; (18) Gytoku; (19) Nanao bay; (20) Fuji-gawa river mouth; (21) Shinji-ko; (22) Aijisu; (23) Itoshima-gun; (24) Miyazaki; (25) Anraku estuary; (26) Ishigaki-jima; (27) Incheon; (28) Zhuanghe estuary; (29) Ejia Qi; (30) Ulansuhai Nur; (31) Taolimiao-Alashan Nur; (32) Ulungur Hu; (33) Tacheng county; (34) Dorbiljin; (35) Chaiwopu Hu; (36) Yanqi; (37) Bagrax Hu; (38) Karaxahar; (39) Lop Nur; (40) Qinghai Hu; (41) Pingluo county; (42) Qianjin Hu; (43) Yongning county; (44) Lingwu county; (45) Hongjian Nur; (46) Xiaruyue; (47) Xuanhua county; (48) Beidaihe; (49) Shijiutuo; (50) Tianjin; (51) Beidagang; (52) Beijing; (53) Nanyuan; (54) Qingdao; (55) Pangzhai; (56) Jiaozuo city; (57) Chen Hu; (58) Hong Hu; (59) Jiangsu coast; (60) Sheyang Salt Works; (61) Dunmenkou; (62) Dongtai city; (63) Gaoyou Hu; (64) Liulishie; (65) Tai Hu; (66) Shanghai; (67) Huangpu Jiang; (68) Shangyu county; (69) Ningbo; (70) Zhuji county; (71) Yueqing county; (72) Wenzhou bay; (73) Fuzhou; (74) Jinmen Dao; (75) Xiamen; (76) Poyang Hu Nature Reserve; (77) Dahu Chi; (78) Dong Dongting Hu Nature Reserve; (79) Guangxi; (80) Huiyang county; (81) Futian Nature Reserve; (82) Sanzao Dao; (83) Dongzhaiang Nature Reserve; (84) Deep Bay; (85) Chinshan; (86) Taipei; (87) Kangnan; (88) Litse; (89) Tainan; (90) Parachinar; (91) Kuschil Khan lake; (92) Ziarat; (93) Zangi Nawar lake; (94) Sonmiani lagoon; (95) Pasni bay; (96) Dasht Kuar; (97) Sukkur; (98) Sehwan; (99) Hala; (100) Hab dam; (101) Khinjar lake; (102) Hadero lake; (103) Clifton beach; (104) Haleji lake; (105) Karachi bay; (106) Phoosani lake; (107) Indus delta; (108) Kadhan; (109) Muradani lake; (110) Kallar Kahar; (111) Kharrar jheel; (112) Lal Suhanra National Park; (113) Alipur; (114) Mithankot; (115) Rojhan; (116) Sirsa; (117) Rohtak; (118) Sultanpur National Park; (119) Okhla; (120) Sariska Wildlife Sanctuary; (121) Keoladeo National Park; (122) Jodhpur; (123) Dubai; (124) Ranthambhore National Park; (125) Sawai Madhopur; (126) Udaipur; (127) Little Rann of Kutch; (128) Wild Ass Sanctuary; (129) Bhuj; (130) Chhari-Dhand; (131) Thol Lake Sanctuary; (132) Mandvi; (133) Nalsarovar; (134) Kanewal reservoir; (135) Pariej; (136) Surendranagar reservoirs; (137) Gulf of Kutch; (138) Khijadia Sanctuary; (139) Charakla; (140) Jamnagar district; (141) Okha Mandal; (142) Vari Talab; (143) Bhavnagar; (144) Chhata lakes; (145) Agra; (146) Lucknow; (147) Faizabad; (148) Etawah; (149) National Chambal Sanctuary; (150) Kaziranga National Park.

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



(A. Holcombe *in litt.* 1999); **Lucknow**, specimens thought to be obtained locally, undated (Reid 1887); **Faizabad**, undated (A. O. Hume in Reid 1887); **Etawah**, one female, undated (Hume 1868b);

■ **Madhya Pradesh National Chambal Sanctuary**, more than 100, undated (S. Javed *in litt.* 1999);

■ **Assam Kaziranga National Park**, 10–20 each winter, 1990s (Barua and Sharma 1999).

POPULATION Following massive declines during the nineteenth and much of the twentieth centuries, the global population of this species has stabilised at 15,000–20,000 individuals (including 4,000–5,000 breeding pairs: Hatzilacou 1993), and several colonies are increasing (Crivelli *et al.* 1997, A. Crivelli *in litt.* 1999). The majority of birds breed in the countries of the former USSR (2,700–3,500 pairs: Peja *et al.* 1996) although the largest single colony is at Mikri Prespa lake, Greece, with over 500 breeding pairs (A. Crivelli *in litt.* 1999).

Mongolia Only 200 individuals are estimated to breed in Mongolia (Bold 1997) and the known wintering population is even smaller. Over 300 were recorded on Shuvuun Tsuglaan, Har Us Nuur, in the summer of 1956 (probably breeding), but this number had dropped to 207 in 1972 and by 1981 there were only 13 individuals (Bold 1997). The site has now been abandoned as a regular breeding locality (see Distribution).

China The species previously bred in Xinjiang but is now very rare and no longer breeds (Scott 1989; see Distribution). It was described as common near Beijing at the beginning of the twentieth century but it was rare there by the 1940s (Hemmingsen 1951). Cheng Tso-hsin (1963) also noted that it was rare in northern China. In the 1960s, 50–70 birds were found wintering in Deep Bay (Shenzhen bay) on the border between Hong Kong and mainland China, and 70 were recorded as recently as 1981, but only about 20 were found at the same site in the 1990s; in 1998/1999 no immature birds were observed in the wintering flock in Hong Kong, possibly indicating low breeding success (HKBWS database; see Distribution). The species used to be relatively common at Dong Dongting Hu in Hunan and Poyang Hu in Jiangxi, but there have been no records from the former since 1992, and the population at Poyang Hu has declined in recent years to just a handful of birds (see Distribution), with for example just three seen in winter 1998/1999 (Zhao Jinsheng and Wu Jiandong 1999; see also Xu Weishu and Melville 1994). Following the rapid decline during the twentieth century, the total wintering population in China may be no more than 140 individuals, although there may be as yet undiscovered wintering sites (such as Wenzhou bay before 1999) (SC).

Pakistan In the nineteenth century this was clearly a very common bird in southern Pakistan and along much of the Indus valley. Hume (1872–1873) described it as “wonderfully abundant” in Sind and along the Mekran coast in Baluchistan, and recounted many sightings; Ticehurst (1926–1927) later agreed that it was “common in the bays and inlets of the Mekran coast in winter”. Historically it was much commoner than the Great White Pelican in Sind (footnote to Butler 1875–1877), and the same appears to be the case today: during an eleven-year residence in Karachi (1973–1984), Roberts (1991–1992) found it to be about twice as numerous as Great White Pelican, especially around the coast. It is still common in winter in Thatta district (around Karachi and lower Sind) (Roberts 1991–1992), and flocks of up to 300 have been recorded in the region since the 1970s (Koning and Koning-Raat 1975, Scott 1989, Roberts 1991–1992). However, the sheer numbers of the species in Pakistan have fallen dramatically, and its range has contracted likewise in the 130 years that have elapsed since Hume’s journey down the Indus.

India While flocks of Great White Pelicans stretched for “simply miles” at a lake near Udaipur, Rajasthan, in the nineteenth century, the intermingled Dalmatian Pelicans appeared “greatly in a minority” (Hume 1878b). This nevertheless suggests that rather large numbers were present. Pelican flocks of such magnitude are a thing of the past in India, but small numbers of Dalmatian Pelican still occur, principally in the wetlands of Gujarat,

including the Kathiawar peninsula. In the nineteenth century Lloyd (1873) stated that pelicans “both grey and white” (and thus presumably including this species) were “not uncommon” on both the lakes and coasts of Kathiawar. According to Dharmakumarsinhji (1955) Dalmatian was usually the commonest pelican in Saurashtra (roughly = Kathiawar peninsula) in winter, although in some winters the Great White was more abundant. Parasharya (in press) reports that Dalmatian is still regular in small numbers in coastal regions of Kathiawar and on freshwater reservoirs inland, although he does not provide an estimate of numbers. Further localities are in the Little Rann of Kutch and neighbouring areas of Gujarat, where small numbers (usually up to 10) occur on lakes, usually amongst several hundred Great White Pelicans (B. F. King verbally 1998). A few (again usually fewer than 10) regularly visit Keoladeo National Park in winter, and other small groups are scattered through Rajasthan (see Distribution). A small population (10–20) winters regularly in Kaziranga National Park, Assam (Barua and Sharma 1999, Choudhury 2000c), presumably from an eastern breeding population. The total population wintering in India is likely to be in the low hundreds.

ECOLOGY *Habitat* In Asia the Dalmatian Pelican frequents rivers, freshwater lakes, swamps, brackish coastal lagoons and estuaries (Ali and Ripley 1968–1998, Roberts *et al.* 1986, Roberts 1991–1992, del Hoyo *et al.* 1992, Peja *et al.* 1996, Crivelli *et al.* 1997). Large wetlands with islands appear to be favoured (Roberts 1991–1992). On the Mongolian breeding grounds the birds are found on rivers and lakeshores with sparse plants, reeds *Phragmites* and no mud (Bold 1997). In Hong Kong, they are confined to the mudflats and waters of Deep Bay and have very seldom been recorded in the brackish marshland at Mai Po (SC). Wintering sites in Pakistan are mainly along sea coasts and in deltas, where the birds are generally gregarious, spending much of the day loafing on isolated sandbars (Crivelli and Vizi 1981, Roberts 1991–1992). Similarly, in the Kathiawar peninsula of India, they frequent “coastline and inland waters, being always partial to tidal breakwaters, creeks and mudflats” where they normally forage singly, in pairs or small groups, usually not forming the large flocks of Great White Pelican (Dharmakumarsinhji 1955).

Food Dalmatian Pelicans tend to fish in the morning and late afternoon, usually close to their roosting grounds (Crivelli and Vizi 1981). They often forage singly, or in small groups, typically sweeping their bills in scythe-like fashion under water, and plunging their heads periodically while swimming (del Hoyo *et al.* 1992). Fishing is sometimes undertaken by cooperative groups (Roberts 1991–1992, del Hoyo *et al.* 1992). While some authors report that flocks tend to remain separate from Great White Pelican (e.g. Himmatsinhji 1997), others describe them as intermingling freely (Hume 1878b). The diet almost entirely comprises fish, especially cyprinids in freshwater wetlands, and eels, mullet, gobies and shrimps in brackish waters (Crivelli and Vizi 1981, 1994). The pouches of collected birds have contained worms, beetles, prawns, catfish and other small fish (Dharmakumarsinhji 1955). The size of prey taken ranges from 30 to 1,200 g in weight and 5 to 42 cm in length (Crivelli and Vizi 1981), although a 50 cm pike *Esox lucius* has been recorded (del Hoyo *et al.* 1992). The daily food intake has been estimated at 1,000 to 1,200 g per adult (Dementiev and Gladkov 1951–1954, Korodi 1964).

Breeding The species nests in catchment areas of rivers and lakes that have abundant fish and vegetation (Bold 1997). In the western portion of its range breeding begins in March or April, somewhat earlier than in Great White Pelican (del Hoyo *et al.* 1992). Colonies are usually sited on islands in emergent aquatic vegetation (e.g. dense stands of reeds *Phragmites* or *Typha*), or on floating vegetation and islands (del Hoyo *et al.* 1992, Crivelli 1994, Peja *et al.* 1996, Pyrovetsi 1997). The nest is a pile of reeds, grass, sticks and other vegetation, gradually cemented together with droppings (del Hoyo *et al.* 1992). Usually 2–4 (extremes of 1–6) eggs are laid, these being incubated for 30–34 days and chicks fledging after another c.85 days (del Hoyo *et al.* 1992). Juveniles gather together to form “pods” after around 6–7 weeks,

independence is reached after 100–105 days and sexual maturity is probably reached after 3–4 years (del Hoyo *et al.* 1992).

Migration The Dalmatian Pelican is perhaps more a wanderer than a true migrant, although it is described as a winter visitor to Pakistan and northern India (Ripley 1982). In Pakistan, it uses the same migration route as the Great White Pelican, passing through the upper Kurram valley and across north-west Baluchistan in February–April (Roberts 1991–1992). The first birds usually arrive in lower Sind by late August, and individuals linger until April (Roberts 1991–1992). Extreme dates reported by Ticehurst (1922–1924) were 30 November and 5 March. Movements are sometimes governed by bad weather: for example, hundreds of individuals were driven down to the hills of Baluchistan by poor weather in February 1929 (Stockley 1930). Little is known about the exact whereabouts of the breeding grounds of birds wintering in southern Pakistan and north-west India, but these presumably lie in Central Asia; a dead bird found in Gujarat bore a ring from Almaty, Kazakhstan (Thacker and Maniar 1997).

It is likely that the birds that winter in east Asia breed in Mongolia (A. Bräunlich *in litt.* 2000) and/or Central Asia. Birds have been recorded on passage in western and central Inner Mongolia, China, for example at Ulansuhai Nur where they pause for around a week in late September and a few days in early April (Yang Guisheng *et al.* 1998). Their migration routes from Inner Mongolia to the wintering grounds remain a mystery, but they presumably follow an inland route given the paucity of records from Beidaihe in Hebei (see Distribution), where the species was previously unknown (Hemmingsen 1951), and the lack of records from elsewhere in north-east China or eastern Mongolia.

THREATS Past declines in the global population of this species were primarily caused by wetland drainage, shooting and persecution by fishermen (Crivelli 1994, Crivelli *et al.* 1997, A. Crivelli *in litt.* 1999). Continuing threats include disturbance, wetland alteration and destruction, water pollution, collision with power-lines and over-exploitation of fish stocks (Hatzilacou 1993, Crivelli *et al.* 1999). The threats to this species in Asia include habitat loss and modification, hunting, disturbance and pollution.

Habitat loss and degradation Many wetlands have been drained and converted to agriculture, or are used by large numbers of people, throughout the breeding and wintering range of this species. *Mongolia* In the Mongolian breeding grounds, fluctuations in water level and degradation of shoreline vegetation reduce nesting success (Bold 1997). *Mainland China* The species is apparently extinct at its former breeding locality at Lop Nur in Xinjiang because the lake dried up in the 1960s and it has been used as a nuclear test site (SC; also Scott 1989). There appears to be little published about its decline in eastern China, although habitat loss is likely to be a significant factor (see equivalent sections under, e.g., Swan Goose *Anser cygnoides*, Siberian Crane *Grus leucogeranus*, Black-faced Spoonbill *Platalea minor*, etc.). An account of threats in Inner Deep Bay appears under Spoon-billed Sandpiper *Eurynorhynchus pygmeus*. *Pakistan* For many years wetlands have been intensively used by people as a source of fish and birds for food (see Ali 1927, 1936). An account of threats to wetlands in Sind appears under Marbled Teal *Marmaronetta angustirostris*. *India* A dam has been proposed across the mouth of the Gulf of Kutch, which would spell disaster for the ecosystem (Scott 1989). Threats to Keoladeo and Sultanpur National Parks are outlined in the equivalent sections under Sarus Crane *Grus antigone*; threats to the Brahmaputra valley of Assam are outlined under Lesser Adjutant *Leptoptilos javanicus*.

Hunting Hunting is a considerable threat to the species, at least locally, and was thought to be the main factor driving the recent decline of the species; it is hunted for food and sometimes (or at least incidentally) for the skin of its bill, which is used to make sheaths for hunting knives and tobacco pouches (Crivelli 1981, 1987). *Mongolia* This species is hunted for its bill, which is used traditionally as a sweat wipe for horses (D. Batdelger *in litt.* 1998, A. Bräunlich and H. Mix verbally 2000). *Mainland China* Hunting and disturbance are likely to

be significant factors in the decline of this pelican in eastern China (see, e.g., Lou Jianjian 1993a; and equivalent section under Spot-billed Pelican). *Pakistan* Historically, the species was kept captive “on all the inland waters”; the Mohanas (the inland fishermen) in Sind used them as decoys to attract waterbirds (including pelicans) (Hume 1872–1873, Ali and Ripley 1968–1998). Individuals were reported shot during migration at Parachinar (Roberts 1991–1992) and many were killed with sticks by local Pathans in February 1929, when several hundred pelicans were driven down onto the hills between Ziarat and Loralai by bad weather (Stockley 1930). In general the level of hunting around wetlands in Pakistan is very high (see equivalent section under Marbled Teal and White-headed Duck *Oxyura leucocephala*) *India* Hunting is apparently less common in India than in Pakistan, but it is still a tangible threat in Gujarat and Rajasthan, presumably affecting this species (A. R. Rahmani *in litt.* 1999).

Disturbance, predation and flooding at colonies Fishermen often try to eliminate breeding colonies to reduce competition for fish stocks (Crivelli and Vizi 1981). Breeding success in Europe is particularly low because of predation, disturbance and flooding (Crivelli and Vizi 1981), problems that presumably also attend breeding sites in Asia. Breeding-site fidelity is strong in the species, with many colonies attended for hundreds of years, and it shows less ability to nest opportunistically than Great White Pelican (Crivelli and Schreiber 1984). In 1984 only five (25–35% of the population) of 19 breeding colonies received legal protection (Crivelli and Schreiber 1984). The species is susceptible to disturbance on the breeding grounds; nests are readily abandoned if the birds are disturbed (Crivelli and Schreiber 1984).

Pollution An account of the problem posed by pesticides and fertilisers in wetlands of the Indian subcontinent appears under Sarus Crane. In the Gulf of Kutch, India, wetlands are threatened by pollution from industries in adjacent towns; municipal waste is dumped off the coast from barges (Scott 1989). The wintering grounds in Inner Deep Bay in Hong Kong are also severely polluted (SC).

MEASURES TAKEN Conservation efforts have reduced the impact of the major threats in Europe (Crivelli *et al.* 1997, *in press*). Marking and dismantling of power-lines (Crivelli *et al.* 1997), the provision of breeding platforms in Turkey and Bulgaria and rafts in Greece, together with wardening and education programmes at key sites, have reduced mortality and increased breeding success (Crivelli 1996). The species is legally protected in all western Palearctic range states, and a European action plan was published in 1996 (Crivelli 1996). Measures taken for its conservation in Asia are detailed below.

Legislation The Dalmatian Pelican is listed on Appendix I of CITES and both Appendix I and Appendix II of the CMS (Bonn Convention, for which see Boere 1991). *Mongolia* Hunting has been prohibited since 1953 and the species has been included in the Mongolian Red Books (Bold 1987, 1997). *Mainland China* It is a nationally protected species (second class) in China. *India* This species is protected under the Indian Wildlife Act (1972).

Protected areas and habitat management *Mongolia* Artificial nest platforms were to be erected for the pelicans at Ayrag Nuur lake in spring 2000 to counter the problem that fluctuating water levels cause to the nesting birds and to stimulate some of the non-breeders which summer at the site to start nesting (A. Bräunlich *in litt.* 2000). *China* The species is protected in Futian Nature Reserve in Guangdong and Mai Po Nature Reserve in Hong Kong, and it also formerly wintered in Dong Dongting Hu Nature Reserve in Hunan (see Distribution). *Pakistan* The species has occurred at Lal Sohanra National Park and Zangi Nawar Wildlife Sanctuary, but there have been no recent records from these sites. *India* Birds regularly visit Keoladeo National Park, Sultanpur National Park and Kaziranga National Park in small numbers. Khijadia lakes, Gujarat, have been declared a bird sanctuary in which all hunting is prohibited; although no management occurs, an attempt has been made to fence the area and ensure that illegal grazing, cutting of firewood and poaching are controlled (Scott 1989). Nalsarovar lake is a bird sanctuary in which a core zone of 1 km² is kept entirely free from disturbance (Scott 1989).

MEASURES PROPOSED As disturbance to pelican colonies causes reductions in breeding success and colony abandonment, breeding sites need to be managed so that disturbance is minimised (Crivelli and Schreiber 1984). Maintenance of the food supply is also crucial, as it has been shown that reproductive success in at least one pelican species declines in relation to fish abundance (Anderson *et al.* 1982). Wherever possible, conflict between pelicans and local fisheries should be minimised and attempts made to maximise the fish stocks of wetlands associated with colonies. Provision of floating rafts at colonies has proven effective in reducing the problem of flooding (Crivelli and Schreiber 1984), and this technique should be employed in as many colonies as possible. **Protected areas** *Mainland China* Hongjiandiao oasis in Shaanxi was established as a non-hunting area in 1981 (67 km²), but this should be expanded to cover the whole area (c.1,000 km²) and established as a nature reserve (Lu Jianjian 1990). The status of the species in Wenzhou bay in Zhejiang should be investigated, and a new protected area established if appropriate. *Pakistan* In view of their importance for the species in winter, Khushdil Khan lake, Sonmiani lagoon, Hadiero and Haleji lakes and Hub Dam need to be considered for protection on a priority basis. *India* Management proposals for Chhari-Dhand, Gujarat, include the establishment of a wildlife sanctuary, digging some of the lake bed in the dry season to ensure suitable depths for pelicans, control of overgrazing, and annual removal of *Prosopis juliflora* which is encroaching on the wetland, as well as local environmental awareness programmes (Tiwari 1997). At Khijadia Lakes Wildlife Sanctuary, Gujarat, there are plans to minimise grazing and disturbance, and to dredge the lakes so that more monsoonal water is retained (Scott 1989). Nalsarovar lake should be recognised as a Ramsar site, an education and tourism centre established, and disturbance and exploitation of natural resources strictly controlled (Scott 1989). Conservation needs at Keoladeo National Park, Bharatpur are outlined under Sarus Crane.

Research Crivelli and Vizi (1981) recommended detailed biological research on the species in different parts of its range and the monitoring of its populations. Scientific studies on the breeding ecology in Mongolia is urgently needed; the results should be used for drafting an Asian conservation plan for this species.

Education There is an urgent need for awareness campaigns, with a view to reducing levels of hunting and disturbance at key wetlands (Crivelli and Vizi 1981).

REMARKS (1) The confusion in taxonomy and identification between this species and Spot-billed Pelican *Pelecanus philippensis* potentially affects a number of records in this account (particularly those marked “see Remarks 1”), and the problem is aired in Remarks 1 under Spot-billed Pelican. (2) *Bangladesh* The species was listed by Rashid (1967) as possibly occurring in the north-east lowlands, and as a former visitor by Harvey (1990), but there are no confirmed records and it is now unlikely to occur as no large undisturbed wetlands remain (P. M. Thompson *in litt.* 1997). *Sri Lanka* Roberts (1991–1992) reported both Dalmatian and Spot-billed Pelicans feeding together in “Yala National Park”, late February, undated, but this record is unlikely to involve wild vagrants. *Myanmar* Although the species was thought possibly to occur as a winter visitor (Smythies 1986), there have been no confirmed records. *Vietnam* In 1995, local fishermen reported the regular occurrence in winter of a small flock of pelicans at the mouth of the Red River at Xuan Thuy Nature Reserve; although initially identified as Dalmatian Pelicans (Le Dien Duc 1995), only Spot-bills have recently been recorded from the site and it is now thought that Dalmatian has never conclusively been recorded in the country (J. C. Eames *in litt.* 1999, Eames and Tordoff *in prep.*). (3) The species was found in both southern Japan and north-east Taiwan in early 1998, indicating that a small influx had taken place in that region. (4) Several older authors treated Dalmatian and Spot-billed Pelicans as separate species and listed them both from the same localities, including Lefevre (1962) for Qingdao in Shandong, Sowerby (1943) for Shanghai and Tai Hu lake in Jiangsu, and La Touche (1925–1934) for Fuzhou in Fujian. It is not possible to judge

how accurately they differentiated the records of the two pelicans (see Remarks 1), but these localities have here been given under both species as published. (5) Deng Juxie *et al.* (1989) regarded these individuals as Spot-billed Pelicans merely because Hainan is on the distribution map for that taxon in Cheng Tso-hsin (1987), which contains very old and sometimes inaccurate material (Gao Yuren *in litt.* 1998). As there are no other recent reports of Spot-billed Pelican from southern China and Dalmatian Pelican is a regular winter visitor to Hong Kong, these wintering pelicans are here presumed to have been the latter species. (6) A record of 2,600 birds at Kur lagoon in Badin district of Sind, January 1988 (Scott 1989) in fact refers to Great White Pelican *P. onocrotalus* (del Hoyo *et al.* 1992), and was probably an overestimate even for that species (T. J. Roberts verbally 1997).