

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

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

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

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STELLER'S SEA-EAGLE

Haliaeetus pelagicus

Critical —
Endangered —
Vulnerable C1



This large, mainly coastal raptor has a small, declining population as a result of habitat destruction, pollution, poisoning by lead shot, and overfishing. It therefore qualifies as Vulnerable.

DISTRIBUTION Steller's Sea-eagle breeds in eastern Russia, and winters mainly there and in northern Japan, with small numbers recorded in winter in North Korea, South Korea and north-east China.

■ **RUSSIA** The entire population of this species nests near to the coast of eastern Russian, mainly on the Kamchatka peninsula (Koryakia and Kamchatka), and in Magadan (along sea-coasts and up to 110 km inland up all the main salmon rivers) and Khabarovsk (on coasts and islands of the Sea of Okhotsk plus large inland lakes along the lower Amur south to the Gorin river), with much smaller numbers in Chukotka (southernmost parts) and on Sakhalin and the Kuril islands (supposedly throughout: Bergman 1935). Its breeding range is mainly around the coasts of the Sea of Okhotsk, but some breed in the lower Amur river drainage. A proportion of the population winters within the breeding range, including many on the Kamchatka peninsula and smaller numbers on the Sea of Okhotsk coast, and some winter south of the breeding grounds in Primorye and southern Sakhalin. Its breeding range appears to have remained unchanged, other than on Sakhalin where some breeding areas have been lost where oil and gas fields have started to be exploited (see Masterov *et al.* 2000). Records (by province) are as follows:

■ **Chukotka** (southernmost parts of the region only): between **Egvekinot** and **Anadyr**, adult, June 1992 (P. Alström, U. Olsson and D. Zetterström *in litt.* 2000); **Penkigney inlet**, 50 km north-east of Providenia town, subadult, September 1989 (AVA); **lower Anadyr' river**, occasional visitor, undated (Portenko 1939, Dorogoy 1993, Kondrat'ev 1994); middle reaches of the **Velikaya river**, Anadyrskiy district, pair seen near a nest, September 1993, presumably breeding (Kondrat'ev 1994);

■ **Koryakia lower Penzhina river**, northern Kamchatka peninsula, occurring sporadically, 1970s, but not proved to breed (Lobkov 1984, Lobkov and Neufeldt 1986); lower **Apuka river**, north-east Kamchatka, three nests located, 1960s–1980s (see map in Lobkov and Neufeldt 1986); north-east coast of Kamchatka peninsula from **Korfa bay** (Korf bay) to the Kamchatka river estuary, 16 nests located, 1960s–1980s (see map in Lobkov and Neufeldt 1986); between **Karaga** (Karagi) and Tilichiki villages, common breeding bird, undated (Belopol'skiy and Rogova 1947); **Karaginskiy island**, north-east Kamchatka, nesting birds in the mid-1970s (Gerasimov 1979), nesting in 1996 (AVA); **Utkolokskiy cape** (Cape Utkolok) to the Penzhina river mouth, 16 nests located, 1960s–1980s (see map in Lobkov and Neufeldt 1986); **Ust'-Khayryuzovo**, adult and immature, June 1992 (P. Alström, U. Olsson and D. Zetterström *in litt.* 2000);

■ **Kamchatka** east coast from the **Kamchatka estuary** to Zhupanova Lagoon, 15 nests located, 1960s–1980s (see map in Lobkov and Neufeldt 1986); **Kamchatka river** drainage, 10 nests located, 1960s–1970s (see map in Lobkov and Neufeldt 1986); **Petropavlovsk-Kamchatskiy** (Petropaulovsk), September 1880 (one egg in BMNH), October 1920 and April 1921 (two specimens in NRM); western coast of Kamchatka from the **Bol'shaya estuary** to Cape Utkholok, 22 nests located, 1960s–1980s (see map in Lobkov and Neufeldt 1986); south

to **Lopatka cape** and the Bol'shaya river basin, 16 nests located, 1960s–1980s (see map in Lobkov and Neufeldt 1986);

■ **Magadan Evensk** (Bol'shaya Garmanda, Garmanda river), probably breeding, 1990s (Potapov *et al.* 2000a); **Gizhiga river**, west side of Shelikhov bay, probably breeding, 1990s (Potapov *et al.* 2000a); **Nayakhanskaya bay** (Nayakhan bay) and estuary, one territorial pair, 1990s (Potapov *et al.* 2000a); **Nayakhan river**, four territorial pairs, 1990s (Potapov *et al.* 2000a); **Storozhevoy cape**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Tavatum river**, eagles seen but no breeding recorded, 1990s (Potapov *et al.* 2000a); **Shirokaya river**, eagles seen but no breeding recorded, 1990s (Potapov *et al.* 2000a); **Tavatum cape**, two territorial pairs, 1990s (Potapov *et al.* 2000a); **Viliga river**, 500 km north-east of Magadan, one pair reported to breed, undated (E. R. Potapov *in litt.* 1999); **Pestraya Dresva bay**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Taygonos peninsula**, Shelikhov bay, north-east Sea of Okhotsk, undated (Potapov *et al.* 1995); **Topolovka river**, one territorial pair reported, 1997 (Potapov *et al.* 2000a); **Kalalaga river** (Kalaloga river), one territorial pair reported, 1997 (Potapov *et al.* 2000a); **Tumany river**, one territorial pair reported, 1996 (Potapov *et al.* 2000a); **Ostrovnoy cape**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Bulun river**, possibly breeding, undated (Kishchinskiy 1968); lower Chelomdja river, up to the **Khuren river**, including part of Magadan State Reserve, 17 territorial pairs, 1990s (Potapov *et al.* 2000a; also Utekhina 1995); **Takhtoyama river**, 300 km north-east of Magadan, 5–6 breeding pairs reported by local people, undated (E. R. Potapov *in litt.* 1999); **Iretskiy cape** (Iret' Cape), one territorial pair, 1990s (Potapov *et al.* 2000a); Ostrovnoy cape to **Arman mountains**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Chelomdza river** (Chelomdja river), from the Khuren river to the Burgagylkan, one territorial pair, 1990s (Potapov *et al.* 2000a); **Oyra river** (Oira river), one territorial pair, 1996 (Potapov *et al.* 2000a); **Omylen river**, one territorial pair, 1990s (Potapov *et al.* 2000a); **lower Yana river**, Yana-Okhotskaya, 100 km west of Magadan, three territorial pairs, 1986 (Potapov *et al.* 2000a), 2–3 pairs breeding annually (AVA); **Amakhtonskiy bay** (Amakhton bay) to Motykley cape, up to eight territorial pairs, 1990s (Potapov *et al.* 2000a); Kava river, from the Ikrimun river to the **Tauy river**, including part of Magadan State Reserve, nine territorial pairs, 1990s (Potapov *et al.* 2000a; also Utekhina 1995); **Kava river**, from the sources to the Ikrimun river, including part of Magadan State Reserve, five territorial pairs reported, 1990s (Potapov *et al.* 2000a; also Utekhina 1995); **Khalanchiga river**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Tauy estuary** to Amakhton cape, up to seven territorial pairs, and up to six territorial pairs on the Tauy river, 1990s (Potapov *et al.* 2000a); **Chukcha river**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Amunka river** (Omunka river), one territorial pair reported, 1990s (Potapov *et al.* 2000a); **Ussulu river** (Ussulu river), one territorial pair, 1994 (Potapov *et al.* 2000a); Uira Spit to **Dukcha estuary**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Nedorazumeniya island** (Nedorasumenia island), one territorial pair, 1990s (Potapov *et al.* 2000a; also P. Alström, U. Olsson and D. Zetterström *in litt.* 2000); **Shelikan island**, one territorial pair, 1999 (Potapov *et al.* 2000a); middle and lower reaches of the **Yama river**, from the Alut tributary to the Khalanchiga, including part of Magadan State Reserve, 10 territorial pairs, 1990s, with some birds overwintering because of the salmon spawning sites along this river (Potapov *et al.* 2000a, I. G. Utekhina *in litt.* 1997); **Staritskogo peninsula**, three territorial pairs, 1990s (Potapov *et al.* 2000a); north coast of the Sea of Okhotsk from **Onatsevicha cape** to Lisyanski cape, common breeding species, c.50 nesting pairs located during surveys in 1996–1997, at a density of 0.7 pairs per 10 km of coast (I. G. Utekhina *in litt.* 1997); **Yapon cape** to P'yagina cape, one territorial pair, 1990s (Potapov *et al.* 2000a); **Sredniy cape** to Tolstiy cape, one territorial pair, 1990s (Potapov *et al.* 2000a); **Motykleyka river**, one territorial pair, old nest found, 1990s (Potapov *et al.* 2000a); **Motykleyskiy bay** (Motykley bay), 12 territorial pairs, 1990s (Potapov *et al.* 2000a); **Rechnoy cape** to Ola Lagoon, one territorial pair, 1990s (Potapov *et al.* 2000a); **Stanyukovicha cape** (Stanukevicha cape) to Oira estuary, 25 territorial pairs,

1990s (Potapov *et al.* 2000a); **Malkachan river**, four territorial pairs, 1997 (Potapov *et al.* 2000a, AVA); **Beringa cape** to Rechnoy cape, three territorial pairs, 1990s (Potapov *et al.* 2000a); **Talan island**, 1–2 nesting pairs annually since observations began in 1986 (Kondrat'ev *et al.* 1992, AVA; also P. Alström, U. Olsson and D. Zetterström *in litt.* 2000), up to two territorial pairs, 1990s (Potapov *et al.* 2000a); **Melkovodnaya bay** to Naidenaya bay, seven territorial pairs, 1990s (Potapov *et al.* 2000a); **Odyan bay**, 50 km east of Magadan, common breeding bird, 9–10 pairs nesting annually (I. G. Utekhina *in litt.* 1997, AVA); **Spafar'yeva island** (Spafariev island), three territorial pairs, 1990s (Potapov *et al.* 2000a); **Babushkina bay**, five territorial pairs, 1990s (Potapov *et al.* 2000a); **Kalkuty river**, one territorial pair, but no breeding, 1990s (Potapov *et al.* 2000a); **Khindzha river** (Khindya river), one territorial pair, 1990s (Potapov *et al.* 2000a); **Kekurni bay** (Kekurniy cape) to Shilki estuary, three territorial pairs, 1990s (Potapov *et al.* 2000a); Berezovka estuary to **Taran cape**, six territorial pairs, and 13 territorial pairs from Taran cape to Melkovodnaya bay, 1990s (Potapov *et al.* 2000a); **Siglan river**, five territorial pairs, 1990s (Potapov *et al.* 2000a); **Zav'yalova island**, two territorial pairs, 1990s (Potapov *et al.* 2000a); **Siglan bay**, 3–4 pairs nesting in 1994, some staying to overwinter (AVA), five territorial pairs, 1990s (Potapov *et al.* 2000a); **Sivuch river**, two territorial pairs, 1998 (Potapov *et al.* 2000a); **Kiras cape** to Burgauli estuary, 11 territorial pairs, 1990s (Potapov *et al.* 2000a); **Koni peninsula**, 50 km south-east of Magadan, including part of Magadan State Reserve, common breeding bird, 16 pairs nesting annually at a density of 1.0–1.7 pairs per 10 km of coast (I. G. Utekhina *in litt.* 1997); **Yevreinova cape** (Evreinova cape), two territorial pairs, 1994–1995 (Potapov *et al.* 2000a, AVA); **Burgauli river**, one territorial pair, 1990s (Potapov *et al.* 2000a);

■ **Khabarovsk Kukhtuy river**, near Okhotsk, five active nests counted in 1997 (E. R. Potapov *in litt.* 1999), four territorial pairs, 1990s (Potapov *et al.* 2000a); **Inya river**, breeding, but not present in winter (Roslyakov 1988), five territorial pairs, 1990s (Potapov *et al.* 2000a), 6–7 breeding pairs between 25 km and 75 km from the coast, July 1999, but absent from the lower part of the river because of disturbance by villagers from Inya settlement (AVA); **Ul'beya river**, c.50 km east of Okhotsk, from the estuary to 40 km upstream, nine pairs nesting in 1996–1997 at a density of 2.7 pairs per 10 km (Potapov *et al.* 2000a, I. G. Utekhina *in litt.* 1997); Bystrukha river to **Ushki bay**, up to 20 territorial pairs, 1990s (Potapov *et al.* 2000a); **Okhota river**, Okhotsk district, up to 13 birds present in summer, and gatherings of 20–30 recorded in winter, with 10 in winter 1986 (Roslyakov 1988), at least three territorial pairs, 1990s (Potapov *et al.* 2000a), satellite-tracking data indicating that the section of the valley c.100 km from the river mouth is an important staging area for subadult birds on migration (E. R. Potapov *in litt.* 1999); **Yeyrineyskiy cape** (Eyrineyskaya cape, Eirineyskiy cape) to Kekurniy cape, eight territorial pairs, 1990s (Potapov *et al.* 2000a); **Kulku river**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Kulku bay** (Kulky bay) to Kulku estuary, two territorial pairs, and one territorial pair between Kulku bay (Kulky bay) and the Ketlaski estuary, 1990s (Potapov *et al.* 2000a); **Uklyuchan river**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Urak river**, one territorial pair, 1990s (Potapov *et al.* 2000a); Sea of Okhotsk coast from **Duga cape** (Duga-Zapadnaya cape) to Yeyrineyskiy cape, half-way between Magadan and Okhotsk, common breeding bird, c.40 breeding pairs in the mid-1990s, at a nesting density of up to four pairs per 10 km of shoreline (I. G. Utekhina *in litt.* 1997); **Duga West point** (West Duga) to Yeyrineyskiy cape, nine territorial pairs, 1990s (Potapov *et al.* 2000a); **Ul'ya river**, 100 km south-west of Okhotsk, four territorial pairs, 1990s (Potapov *et al.* 2000a), c.5 pairs nested in 1996 (E. R. Potapov *in litt.* 1999); Kynnerkan estuary to **Otynda estuary**, one territorial pair, 1990s (Potapov *et al.* 2000a); **Kynnerkan river**, two territorial pairs, 1990s (Potapov *et al.* 2000a); **Lantar' river mouth**, Aiano-Maiski district north of Tugur settlement, one, winter 1986 (Roslyakov 1988); **Shantarsk islands**, north-west Sea of Okhotsk, Tuguro-Chumikanskiy district, common breeding bird, with 34 nests located in summer 1982 at a density of about 1 nest per 5–7 km of coastline, and 25–30 birds overwintering

(Roslyakov 1981b, 1988); southern coast of **Udskaya bay**, north-west Sea of Okhotsk, a coastal belt extending for 140 km from the Uda estuary (Chumikan settlement) to Cape Lyutsun (Tugurskiy bay), a common breeding bird, with 19 there in July 1991 (B. A. Voronov *in litt.* 1997); **Uda river**, north-west Sea of Okhotsk, common breeding bird, large wintering concentrations reported to total 100–300 birds on the salmon grounds in the lower reaches of the river (Roslyakov 1988); **Mukhtel' lagoon**, Aleksandra bay, north-west Sea of Okhotsk, a common breeding bird, with 32 birds and 10 occupied nests on the lakeshore, August 1995 (Makhinov *et al.* 1997); coast of **Tugurski bay** (Tugur bay), common breeding bird, with 15 pairs recorded along a 60 km stretch of coast in summer 1980 (Babenko 1985; also Babenko *et al.* 1988a); **Yekateriny bay** (Ekaterina bay), occupied nests with chicks found, undated (Babenko *et al.* 1988a); **Tugur river**, north-west Sea of Okhotsk, common breeding bird, large wintering concentrations reported to total 100–300 birds on the salmon grounds in the lower reaches of the river (Roslyakov 1988); Mukuchen river mouth, Aiano-Maiski district north of **Tugur** settlement, two, winter 1986 (Roslyakov 1988); **Orel' lake**, Nikolaevsky district, lower Amur region, and the lower reaches of rivers and streams flowing into the lake, a common breeding bird, with 15 pairs breeding in 1976, up to 50 birds concentrating there in autumn (Roslyakov 1981b), more than 20 pairs in 1981 (Babenko 1984), 24 nest sites located and 12 occupied nests in 1983 (Babenko *et al.* 1988a); **Chlya lake**, one pair nesting in 1981 (Babenko 1984); **Schast'ya bay**, north of Amur river mouth, occupied nests with chicks found, undated (Babenko *et al.* 1988a), 60–70 birds, October 1986 (Roslyakov 1988); **Orlik lake**, occupied nests with chicks found, undated (Babenko *et al.* 1988a); lower **Konin river**, north-west Sea of Okhotsk, where an occupied nest was found 80 km south-west of Tugur village in July 1989 (Voronov and Pronkevich 1991a); **Chertovo lake**, occupied nests with chicks found, undated (Babenko *et al.* 1988a); **Dal'zha lake**, occupied nests with chicks found, undated (Babenko *et al.* 1988a); upper Tugur river, near **Burukan** weather station, with 0.2 birds per 10 km of river recorded in July–August 1989 (Voronov and Pronkevich 1991a), and 30 birds seen at an ice-free patch where fish were spawning in late November 1990 (V. M. Sapaev *per* B. A. Voronov *in litt.* 1997); **lower Amgun' river**, left-bank tributary of the Amur, P. Osipenko district, nest found 5 km south-west of Kherpuchi village, undated (Voronov and Pronkevich 1991a); **Udyl' lake**, a common breeding bird, with three nests located in 1978 and 7–8 breeding pairs estimated in the area (Smirenskiy and Mitschenko 1980), two breeding pairs, June–July 1989 (Hanawa *et al.* 1989); **Khalan** mountain, 20 km north-west of Mariinskoe village, lower Amur, Ul'chskiy district, two nests found, undated (Voronov and Pronkevich 1991a); **Kizi lake**, occupied nests with chicks found, undated (Babenko *et al.* 1988a); **Tabo bay**, occupied nests with chicks found, undated (Babenko *et al.* 1988a); shores of Tatarsky bay, south to **Chikhacheva bay** (Chikhachev bay), breeding, undated (Babenko *et al.* 1988a); lower Gorin river, **Komsomol'skiy Nature Reserve** (Komsomolsk State Reserve), lower Amur, pair present from 1982 to 1987, and nesting after 1987 (Kolbin 1988);

■ **Amur Blagoveshchensk**, undated (Baranchev 1947);

■ **Primorye Iman river** (Bol'shaya Ussurka) basin, wintering on the lower, middle and upper reaches of the river (unspecified years) (Spangenberg 1965); **Erdmana peninsula** (De Friz peninsula), Amurskiy bay near Vladivostok, an uncommon winter visitor, with 1–3 birds in November–December 1960–1986 (Omel'ko 1988); **Valentin bay** to Uspeniya bay, an annual winter visitor, with up to 13 birds counted along a coastal strip of 85 km in February–March 1986 (Medvedev 1988); coast of **Peter the Great bay**, from the Razdol'naya river estuary to the Tumangan river estuary, including Kedrovaya Pad' State Reserve, an annual winter visitor, 50–60 birds wintering there in 1973–1979, and 25–30 birds (62% being adults) in February 1986 (Shibnev 1981, Shibnev and Glushchenko 1988), 12 adults and eight juveniles counted from a helicopter along a 513 km stretch of coast in January 1986 (Shibaev and Trukhin 1988);

■ **Sakhalin** at the following localities in northern Sakhalin (dates unspecified) (Nechaev 1991, Blokhin 1998b): **Shmidta peninsula** (Schmidt peninsula); **Tront bay**; **Kolendu bay**;

Urkt bay; Pil'tun bay; Ten'gi river; Chaivo bay; Vagis river; Pogibi cape; Pogibi river; Dagi bay; Bol'shaya Uangi river; Nyyskiy bay (Nyisky bay); Tym' river; Nabil'skiy bay; Lun'skiy bay; Nevskoye lake; Poronaysk ("Shikuka"), March 1934 (adult female in YIO); and at the following localities in southern Sakhalin (dates unspecified) (Nechaev 1991, Blokhin 1998b): Poronay river; Lamanon cape (Cape Lamaon); Aynskoye lake; Lebyazh'ye lake; Ayrup lake; Tunaycha lake; Lyutoga river; Aniva bay; Lososey bay (Losos' inlet); Kril'on peninsula;

■ **Kuril islands Onnekotan island**, middle Kuril islands, nests found in 1946 and 1974–1977 (Gizenko 1955, Lobkov and Neufeldt 1986); **Iturup island** (Etorofu, Yeterofu), January 1927 (immature in YIO), at "Bettobu", February 1930 (female in NRM); north-east **Kunashir island**, c.50–70 birds present from November to mid-December, but only 4–5 birds present in the other winter months (Voronov 1988).

■ **JAPAN** This species is a winter visitor to Japan, mainly to the northern island of Hokkaido, where it is locally common. A very few birds, mostly juveniles and immatures, winter west of the Kanto region (on the plains of eastern Honshu, in the area around Tokyo), primarily along the Sea of Japan side. Vagrants have been recorded in all parts of Japan, including as far south to Okinawa and Tori-jima in the Izu islands. A few young birds remain on Hokkaido during the summer (Morioka *et al.* 1995). Records (by island and prefecture) are as follows:

Hokkaido throughout the island, but with highest concentrations (including flocks of up to several hundred birds) in the east on the **Shiretoko peninsula**, especially at **Rausu** and **Shari**, and at **Furen-ko** lake near the Nemuro peninsula (WGWESSE 1996);

Honshu ■ **Aomori** Jusan-ko lake, **Shiura-mura**, Kitatsugaru-gun, 2–3 birds annually in December and March (unspecified years) (Y. Yashima *in litt.* 1998); ■ **Iwate Kanegasaki-cho**, Isawa-gun, subadult, March 1990 (WBSJ 1991); **Goyo-zan**, Ofunato-shi, December 1994 (*Birder* 95/2); ■ **Miyagi Izu-numa**, undated (Brazil 1991); **Kinkasan island** (Kinkazan island), undated (Sato *et al.* 1968 in Brazil 1991); ■ **Yamagata Tsuruoka-shi**, two young birds, February 1998 (*Birder* 98/5); ■ **Ibaraki Hi-numa** lake, one, February 1995 (WBSJ 1996), March 1995 (*Birder* 95/5); Miho-mura lake, **Inashiki-gun**, young bird, December 1993 (WBSJ 1996); ■ **Chiba** unspecified locality, February 1887 (female in YIO); **Sakura-shi**, young bird, February 1989 to January 1990 (WBSJ 1990); ■ **Tokyo Shinobazu Pond** (Shinobazu-no-ike), Ueno Zoo, February 1974 (WBSJ 1975); **Taito-ku**, February 1893 (male in YIO); Inogashira Park, **Tokyo**, November 1974 (WBSJ 1975); ■ **Kanagawa Nishikubo**, Chigasaki-shi, one, February 1986 (WBSJ 1986); **Yokohama**, before 1986 (WBSJ Kanagawa Chapter 1992); **Ischara-shi**, before 1986 (WBSJ Kanagawa Chapter 1992); **Chigasaki-shi**, before 1986 (WBSJ Kanagawa Chapter 1992); **Fujisawa-shi**, before 1986 (WBSJ Kanagawa Chapter 1992); **Zushi-shi**, "irregularly recorded", 1986–1991 (WBSJ Kanagawa Chapter 1992); **Yokosuka-shi**, "irregularly recorded", 1986–1991 (WBSJ Kanagawa Chapter 1992); **Hakone-machi**, before 1986 (WBSJ Kanagawa Chapter 1992); ■ **Niigata Sado island**, undated (OSJ 2000); Toriyano-gata, **Niigata-shi**, young bird, January 1998 (*Birder* 98/5); **Joetsu-shi** area, rare winter visitor, more seen on passage migration (unspecified years) (Nakamura 1994); ■ **Toyama Kano**, Himi-shi, December 1986 (WBSJ Toyama Chapter database); Kurobe-gawa river, **Kurobe-shi**, November 1980 and February 1998 (WBSJ Toyama Chapter database); Kurobe-gawa river, **Unazuki-machi**, Shimoniikawa-gun, January 1986 (WBSJ Toyama Chapter database), Unazuki-machi, Shimoniikawa-gun and Kurobe-shi, December 1995 (WBSJ Toyama Chapter database); **Oyabe-gawa** river, Nagae, Takaoka-shi, December 1966 (WBSJ Toyama Chapter database); Kuroda, **Takaoka-shi**, November 1969 (WBSJ Toyama Chapter database); **Yokata-kaigan coast**, Toyama-shi, February 1973 (WBSJ Toyama Chapter database); ■ **Ishikawa Ochi-gata**, Haiku-shi, young bird, January 1994 (WBSJ 1994); ■ **Yamanashi** unspecified locality, undated (Nakamura 1953 in Brazil 1991); ■ **Nagano Hotaka-machi**, Minamiazumi-

gun, young bird, November 1993 (WBSJ 1994); ■ **Shizuoka Fuji-gawa river mouth**, single birds, February 1983, March 1986, March–April 1990 (WBSJ Totomi Chapter database); **Kambara-cho**, Ihara-gun, one, March–April 1990 (WBSJ 1991); Uchinodai, **Hamakita-shi**, two, January 1991 (WBSJ Totomi Chapter database); **Tenryu-gawa river mouth**, single birds, November 1989 and January 1998 (WBSJ Totomi Chapter database); ■ **Shiga Biwa-ko** lake, December 1993 (*Birder* 94/2); ■ **Wakayama Tonda-gawa** river, Shirahama-cho, Nishimuro-gun, one, February 1993 (WBSJ Toyama Chapter database); ■ **Tottori Karo-ko** (Karo-kaigan) coast, Tottori-shi, January 1989 (WBSJ Tottori Chapter database); **Koyama-ike** pond, Tottori-shi, one, January–February 1994 (*Birder* 94/4), one, March 1994 (*Birder* 94/5); ■ **Shimane Oki islands**, 1950 and 1974 (Uchida 1982); **Nishino-shima** island, Oki islands, 1931 (Uchida 1982); suburb of **Matsue-shi**, collected in 1892 (Uchida 1982); **Jinzai-ko** lake, Izumo-shi, March 1976 (Uchida 1982);

Nii-jima island, Izu islands, spring 1936 (WBSJ 1975, immature specimen in YIO);

Miyake-jima island, Izu islands, winter 1937, March 1957, February 1958 and January 1959 (WBSJ 1975);

Aoga-shima island, Izu islands, young bird, January 1997 (Yane 1998);

Tori-shima island, Izu islands, February 1930 (Austin and Kuroda 1953, WBSJ 1975);

Shikoku unspecified localities, undated (Austin and Kuroda 1953, OSJ 2000);

Kyushu ■ **Saga Kawasoe-machi**, Saga-gun, one collected, December 1931 (Wild Bird Society of Saga 1997); ■ **Nagasaki Tsushima** island, several records, undated (Brazil 1991, OSJ 2000); **Kosaza-cho**, Kitamatsuura-gun, young bird, December 1993 (WBSJ 1994); **Goto islands**, undated (OSJ 2000);

Amami-ooshima island, undated (Ishihara 1983);

Okinawa island, winter c.1886 (Ishihara 1983, Brazil 1991).

■ **KOREA** ■ **NORTH KOREA** It is a rare winter visitor, with records (by province) as follows: ■ **South Hamgyong** unspecified localities, February 1888, 1912, January and February 1917, January 1927 (Austin 1948, Won 1963); ■ **Ryanggang Pochon**, July 1897 (Yankovskii 1898 in Tomek 1999); ■ **South Pyongan** unspecified locality, March 1910 (Austin 1948, Won 1963); Taedong river estuary and **Taesong-ho** lake, undated (Chong and Morishita 1996); **Nampho**, January–February 1990 (J. Fiebig in Tomek 1999); ■ **Kangwon** unspecified locality, April 1913, February 1918 (Austin 1948, Won 1963).

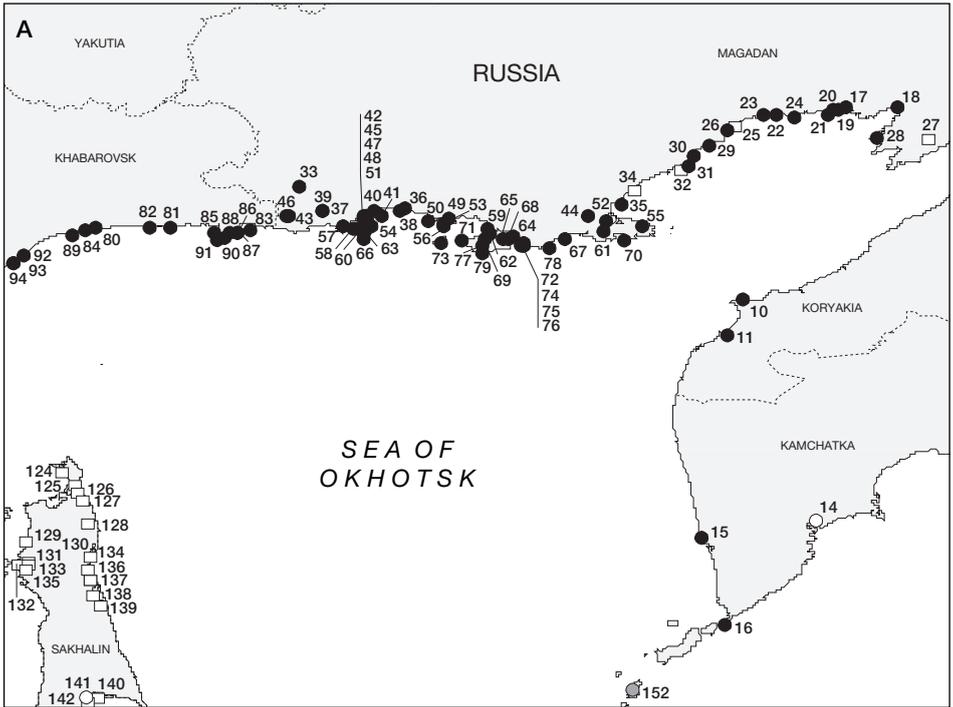
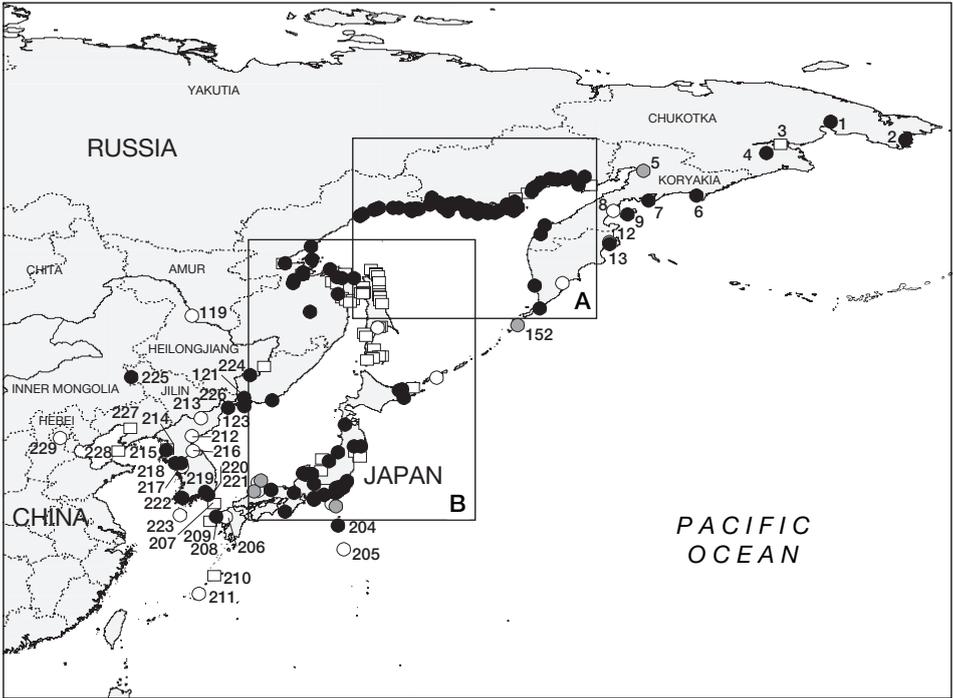
■ **SOUTH KOREA** It is a rare winter visitor, with records (by province) as follows:

■ **Kyonggi and Seoul** unspecified localities, March 1909, February 1910, January 1918 (two), December 1924 (Han Sang-hoon *in litt.* 2000), November 1911, January 1921, January 1929 (Won 1963), January 1921 and October 1926 (two specimens in YIO); **Imjin river**, three seen, February 1998 (Lee Woo-shin *in litt.* 1998); **Han river**, one seen, January 1996 (Lee Woo-shin *in litt.* 1998); **Inchon**, one collected, February 1915 (Han Sang-hoon *in litt.* 2000; also Won 1963), one seen south of Inchon near Sin-gil-li village, March 1947, and one seen on a similar coastal marsh, February 1948 (Wolfe 1950); ■ **South Kyongsang Chunam reservoir** (Junam), juvenile seen, November 1991 (Won 1991), one seen, December 1996 (Lee Woo-shin *in litt.* 1998); **Nakdong river**, one collected, 1968, one seen, January 1998 (Lee Woo-shin *in litt.* 1998), one seen in November 1996 and February 1997 (Hur *et al.* 1999); ■ **South Cholla Yongam lake**, Dangdu-ri, one seen, November 1999 (N. Moores *in litt.* 1999); unspecified localities, undated (OSJ 1942 *per* Han Sang-hoon *in litt.* 2000); ■ **Cheju** unspecified localities, undated (OSJ 1942 *per* Han Sang-hoon *in litt.* 2000).

■ **CHINA** It is a rare winter visitor to north-east China, with records (by province) as follows:

■ **Heilongjiang Xingkai Hu National Nature Reserve** (Chinese side of Lake Khanka), Mishan county, one seen, March–April 1997 (Piao Renzhu and Li Wenfa 1998);

■ **Jilin Xianghai National Nature Reserve**, Tongyu county, one satellite-tracked immature bird present on this reserve, late 1990s (M. Ueta verbally 1998); lower **Tumen Jiang** river,



c.10 km from the Sea of Japan, 2–3 birds seen in March 1988 and March 1989 (Yang Xingjia *et al.* 1991, Yang Xingjia *et al.* 1994);

■ **Liaoning Yingkou city**, undated (Cheng Tso-hsin 1987, Liaoning Ornithological Survey Team 1986); Dalian at **Lüshun**, undated (Cheng Tso-hsin 1987, Liaoning Ornithological Survey Team 1986), recorded on the Liaodong peninsula in the 1940s (presumably the same record) (Yang Xingjia *et al.* 1991);

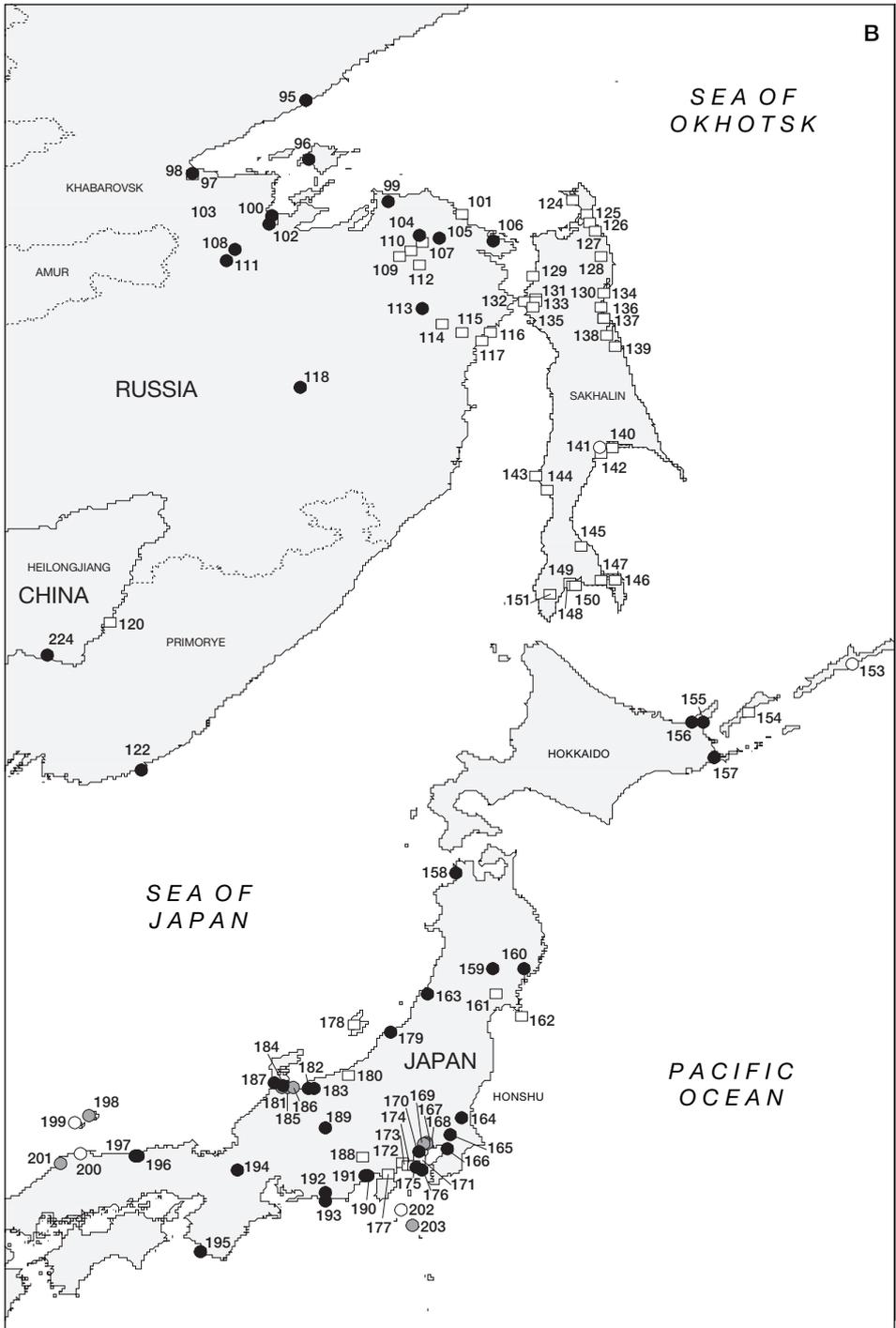
■ **Beijing near Beijing** (“Peking district”), one seen “at very close quarters at the end of a severe winter”, nineteenth century (Père David in La Touche 1925–1934), this is presumably the source of the record in “Hebei province” by Père David in Cheng Tso-hsin (1987).

POPULATION Several estimates have been made of the total population of this species, including c.4,000 birds (Galushin and Pererva 1982 in Brazil 1991) and 6,000–7,000 birds

The distribution of Steller's Sea-eagle *Haliaeetus pelagicus* (maps opposite; note that the species ranges widely on the coasts of Kamchatka and Hokkaido, where only a few specific localities have been traced):

(1) Egvekinot; (2) Penkigney inlet; (3) lower Anadyr' river; (4) Velikaya river; (5) lower Penzhina river; (6) Apuka river; (7) Korfa bay; (8) Karaga; (9) Karaginskiy island; (10) Utkolokskiy cape; (11) Ust'-Khayryuzovo; (12) Kamchatka estuary; (13) Kamchatka river; (14) Petropavlovsk-Kamchatskiy; (15) Bol'shaya estuary; (16) Lopatka cape; (17) Evensk; (18) Gizhiga river; (19) Nayakhanskaya bay; (20) Nayakhan river; (21) Storozhevoy cape; (22) Tavatum river; (23) Shirokaya river; (24) Tavatum cape; (25) Viliga river; (26) Pestraya Dresva bay; (27) Taygonos peninsula; (28) Topolovka river; (29) Kalalaga river; (30) Tumany river; (31) Ostrovnoy cape; (32) Bulun river; (33) Khuren river; (34) Takhtoyama river; (35) Iretskiy cape; (36) Arman mountains; (37) Chelomdzha river; (38) Oyra river; (39) Omylen river; (40) lower Yana river; (41) Amakhtonskiy bay; (42) Tauy river; (43) Kava river; (44) Khalanchiga river; (45) Tauy estuary; (46) Chukcha river; (47) Amunka river; (48) Ussulu river; (49) Dukcha estuary; (50) Nedorazumeniya island; (51) Shelikan island; (52) Yama river; (53) Staritskogo peninsula; (54) Onatsevecha cape; (55) Yapon cape; (56) Sredniy cape; (57) Motykleyka river; (58) Motykleyskiy bay; (59) Rechnoy cape; (60) Stanyukovicha cape; (61) Malkachan river; (62) Beringa cape; (63) Talan island; (64) Melkovodnaya bay; (65) Odyan bay; (66) Spafar'yeva island; (67) Babushkina bay; (68) Kalkuty river; (69) Khindzha river; (70) Kekurni bay; (71) Taran cape; (72) Siglan river; (73) Zav'yalova island; (74) Siglan bay; (75) Sivuch river; (76) Kiras cape; (77) Koni peninsula; (78) Yevreinova cape; (79) Burgauli river; (80) Kukhtuy river; (81) Inya river; (82) Ul'beya river; (83) Ushki bay; (84) Okhota river; (85) Yeyrineyskiy cape; (86) Kulku river; (87) Kulku bay; (88) Uklyuchan river; (89) Urak river; (90) Duga cape; (91) Duga West point; (92) Ul'ya river; (93) Otynda estuary; (94) Kynnerkan river; (95) Lantar' river mouth; (96) Shantarsk islands; (97) Udskaya bay; (98) Uda river; (99) Mukhtel' lagoon; (100) Tugurskiy bay; (101) Yekateriny bay; (102) Tugur river; (103) Tugur; (104) Ore'l' lake; (105) Chlya lake; (106) Shast'ya bay; (107) Orlik lake; (108) Konin river; (109) Chertovo lake; (110) Dal'zha lake; (111) Burukan; (112) lower Amgun' river; (113) Udyl' lake; (114) Khalan; (115) Kizi lake; (116) Tabo bay; (117) Chikhacheva bay; (118) Komsomol'skiy Nature Reserve; (119) Blagoveshchensk; (120) Iman river; (121) Erdmana peninsula; (122) Valentin bay; (123) Peter the Great bay; (124) Shmidta peninsula; (125) Tront bay; (126) Kolenda bay; (127) Urkt bay; (128) Pil'tun bay; (129) Ten'gi river; (130) Chaivo bay; (131) Vagis river; (132) Pogibi cape; (133) Pogibi river; (134) Dagi bay; (135) Bol'shaya Uangi river; (136) Nyyskiy bay; (137) Tym' river; (138) Nabil'skiy bay; (139) Lun'skiy bay; (140) Nevskoye lake; (141) Poronaysk; (142) Poronay river; (143) Lamanon cape; (144) Aynskoye lake; (145) Lebyazh'ye lake; (146) Ayrup lake; (147) Tunaycha lake; (148) Lyutoga river; (149) Aniva bay; (150) Lososey bay; (151) Kril'on peninsula; (152) Onnekotan island; (153) Iturup island; (154) Kunashir island; (155) Rausu; (156) Shiretoko peninsula; (157) Furen-ko; (158) Shiura-mura; (159) Kanegasaki-cho; (160) Goyo-zan; (161) Izu-numa; (162) Kinkasan island; (163) Tsuruoka-shi; (164) Hi-numa; (165) Inashiki-gun; (166) Sakura-shi; (167) Shinobazu pond; (168) Taito-ku; (169) Tokyo; (170) Nishikubo; (171) Yokohama; (172) Isehara-shi; (173) Chigasaki-shi; (174) Fujisawa-shi; (175) Zushi-shi; (176) Yokosuka-shi; (177) Hakone-machi; (178) Sado island; (179) Niigata-shi; (180) Joetsu-shi; (181) Kano; (182) Kurobe-shi; (183) Unazuki-machi; (184) Oyabe-gawa; (185) Takaoka-shi; (186) Yokata-kaigan coast; (187) Ochi-gata; (188) Yamanashi; (189) Hotaka-machi; (190) Fuji-gawa river mouth; (191) Kambara-cho; (192) Hamakita-shi; (193) Tenryu-gawa river mouth; (194) Biwa-ko; (195) Tonda-gawa; (196) Karo-ko; (197) Koyama-ike; (198) Oki islands; (199) Nishino-shima; (200) Matsue-shi; (201) Jinzai-ko; (202) Nii-jima; (203) Miyake-jima; (204) Aoga-shima; (205) Tori-shima; (206) Kawasoe-machi; (207) Tsushima; (208) Kosaza-cho; (209) Goto islands; (210) Amami-ooshima; (211) Okinawa island; (212) South Hamgyong; (213) Pocheon; (214) T'aesong-ho; (215) Nampho; (216) Kangwon; (217) Imjin river; (218) Han river; (219) Inchon; (220) Chunam reservoir; (221) Nakdong river; (222) Yongam lake; (223) Cheju; (224) Xingkai Hu National Nature Reserve; (225) Xianghai National Nature Reserve; (226) Tumen Jiang; (227) Yingkou city; (228) Lüshun; (229) Beijing.

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



(Fujimaki 1987, Nakagawa *et al.* 1987 and Shibaev 1987 in Brazil 1991). However, the latter figures included an estimated wintering population of c.3,535 in Kamchatka in 1985 (Morioka *et al.* 1995), which is probably somewhat overestimated, and a more realistic total is c.5,000 birds (M. Ueta verbally 2000). The breeding population has been estimated at 2,200 (Lobkov and Neufeldt 1986) to 2,300 breeding pairs (Pererva *et al.* 1991), but the most recent information indicates that there are 1,830–1,900 breeding pairs and that the total population is probably 4,600–5,100 individuals (AVA). It is predicted that the various pressures within the range of this species (see Threats) could cause it to decline substantially within the next 50 years (M. Ueta verbally 1999, Ueta and Masterov 2000).

Russia In Magadan province, I. G. Utekhina *in litt.* (1997) estimated a total breeding population of 220–250 pairs, and considered that the breeding population is relatively stable. On larger salmon rivers the density varies from 1.0 to 2.7 pairs per 10 km, and smaller streams (25–50 km in length) usually only support a single breeding pair. Along the coast, the breeding density is uneven, varying from 0.4 to 4.0 pairs per 10 km of coastline. However, on the large salmon rivers near Magadan, its population could soon collapse, following the overharvesting of salmon runs in 1995–1997 (AVA).

Lobkov (1984) estimated that at least 1,200 pairs nested in the Kamchatka region (including southern Koryakia and Kamchatka), although only 320 nests were actually located. At least 1,400 immature birds also occur on Kamchatka in summer, mainly on the west coast of the peninsula (Lobkov 1984). Morioka *et al.* (1995) estimated a wintering population of c.3,535 birds in Kamchatka in 1985, but this is probably too high a figure (M. Ueta verbally 2000).

In the mid-1980s, the total population in Khabarovsk was estimated at c.700 pairs, including c.500 pairs on the Sea of Okhotsk coast, plus c.100 pairs on the Shantarsk archipelago and c.100 pairs in the Amur drainage (Lobkov and Neufeldt 1986). However, a more realistic total is probably 830–950 individuals, including 300–345 breeding pairs and 235–270 non-breeding subadults (AVA). This is based upon the most recent surveys, which found 40–50 pairs on the northernmost coasts and rivers of the region in Okhotsky district (E. R. Potapov *in litt.* 1999), 130–150 pairs nesting at the inland lakes in the lower Amur drainage, 80 pairs breeding along the sea coasts between the Tugur and Amur rivers and 50–65 pairs on the Shantarsk archipelago (Masterov 1998). Khrabry (1989) estimated only 80–90 breeding pairs at the lakes in the lower Amur drainage, but the higher recent estimate was

The distribution of Steller's Sea-eagle *Haliaeetus pelagicus* (map B opposite; Hokkaido greatly under-represented): (95) Lantar' river mouth; (96) Shantarsk islands; (97) Udskaya bay; (98) Uda river; (99) Mukhtel' lagoon; (100) Tugurski bay; (101) Yekateriny bay; (102) Tugur river; (103) Tugur; (104) Orel' lake; (105) Chlya lake; (106) Schast'ya bay; (107) Orlik lake; (108) Konin river; (109) Chertovo lake; (110) Dal'zha lake; (111) Burukan; (112) Amgun' river; (113) Udyll' lake; (114) Khalan; (115) Kizi lake; (116) Tabo bay; (117) Chikhacheva bay; (118) Komsomol'skiy Nature Reserve; (120) Iman river; (122) Valentin bay; (124) Shmidta peninsula; (125) Tront bay; (126) Kolendu bay; (127) Urkt bay; (128) Pil'tun bay; (129) Ten'gi river; (130) Chaivo bay; (131) Vagis river; (132) Pogibi cape; (133) Pogibi river; (134) Dagi bay; (135) Bol'shaya Uangi river; (136) Nyyskiy bay; (137) Tym' river; (138) Nabil'skiy bay; (139) Lun'skiy bay; (140) Nevskoye lake; (141) Poronaysk; (142) Poronay river; (143) Lamanon cape; (144) Aynskoye lake; (145) Lebyazh'ye lake; (146) Ayrap lake; (147) Tunaycha lake; (148) Lyutoga river; (149) Aniva bay; (150) Lososey bay; (151) Krif'on peninsula; (153) Iturup island; (154) Kunashir island; (155) Rausu; (156) Shiretoko peninsula; (157) Furen-ko; (158) Shiura-mura; (159) Kanegasaki-cho; (160) Goyo-zan; (161) Izu-numa; (162) Kinkasan island; (163) Tsuruoka-shi; (164) Hi-numa; (165) Inashiki-gun; (166) Sakura-shi; (167) Shinobazu pond; (168) Taito-ku; (169) Tokyo; (170) Nishikubo; (171) Yokohama; (172) Isehara-shi; (173) Chigasaki-shi; (174) Fujisawa-shi; (175) Zushi-shi; (176) Yokosuka-shi; (177) Hakone-machi; (178) Sado island; (179) Niigata-shi; (180) Joetsu-shi; (181) Kano; (182) Kurobe-shi; (183) Unazuki-machi; (184) Oyabe-gawa; (185) Takaoka-shi; (186) Yokata-kaigan coast; (187) Ouchi-gata; (188) Yamanashi; (189) Hotaka-machi; (190) Fuji-gawa river mouth; (191) Kambara-cho; (192) Hamakita-shi; (193) Tenryu-gawa river mouth; (194) Biwa-ko; (195) Tonda-gawa; (196) Karo-ko; (197) Koyama-ike; (198) Oki islands; (199) Nishino-jima; (200) Matsue-shi; (201) Jinzai-ko; (224) Xingkai Hu National Nature Reserve.

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

based on densities of 2.6–2.8 pairs per 10 km of shoreline (and in some cases up to 7.0) found around the fish-rich Udył' and Oreł' lakes (Masterov 1998). This species has not been found nesting in Primorye, but 55–65 wintering birds were counted there during the first International Steller's Sea-eagle Census in January–February 1986 (Lobkov 1988).

In the 1860s and 1870s it used to be numerous in southern Sakhalin, but it is now unevenly distributed in northern and central districts of the island (Gizenko 1955), with Aleksandrovska on the west coast and Terpenia bay on the east coast currently forming the southern limits of its breeding range (Nechaev 1991). The total population on Sakhalin island was estimated at slightly over 100 pairs in 1983–1987 (Nechaev 1991), and, following surveys in the early 1990s, Masterov (1998) estimated that there were 110 nesting pairs and 160 non-breeding birds. However, Masterov *et al.* (2000) predicted (on the basis of available habitat) that there are 434 potential nesting territories on Sakhalin, and estimated (following transect surveys) that the total number of birds on the island is 560 (including 64.2% adults). In northern Sakhalin, one or (less commonly) two pairs nest on the lower reaches of rivers, and at least 10 pairs bred on the southern coast of Chayvo bay in 1975–1976 and 12–15 breeding pairs were counted on the coasts of Neurtu and Kuegda bays near the Shmidta peninsula in 1988 (Nechaev 1991). On the north-east coast of Sakhalin, 60–75 breeding pairs were counted in summer 1990, including 145–169 adults (75.5% of which were breeding) and 53–67 immature non-breeding birds (Masterov and Zykov 1992). The most densely populated areas are Lun'sky bay (2.8 pairs per 10 km of coast) and the coasts around Cape Ratmanov (1.5 pairs per 10 km) (Masterov 1998). In January–February 1986, 40 wintering birds were counted along 250 km of coastline in southern Sakhalin (south of 50°N), and the total wintering population on the island was estimated at c.60 birds (Nechaev 1988a) or c.50 birds (Nechaev 1991). In winter 1986/1987, 11 birds were counted on the northern Kuril islands and c.160 birds on the southern Kuril islands (Kunashir and Habomai) (Lobkov 1988).

Japan This species was considered to be a rare winter visitor to coastal Hokkaido by Austin and Kuroda (1953), but there appeared to be a major increase in its numbers there in 1975–1980, linked to greatly increased winter fishing, and it is now a locally common, even very common, winter visitor (Brazil 1991). The usual wintering population in Japan is c.2,000 birds, but the highest-ever total of 2,500 birds was reported on Hokkaido and the southern Kuril islands in winter 1999–2000 (*Mainichi Shimbun* 24 January 2000, M. Ueta verbally 2000). Most of the wintering population used to be concentrated along the coast of Rausu, probably because of the availability of fish from the cod *Theragra chalcogramma* fishery there, but in recent years both fishing and eagles have declined at Rausu and the latter have increased near Furen-ko and the Nemuro peninsula, probably because of the availability of discarded fish there; during the 1990s, more eagles also wintered along the rivers of southern Hokkaido, where they fished for salmon (WGWESSE 1996).

ECOLOGY Habitat During the breeding season, this species inhabits sea coasts where cliffs, large rocks or forested slopes (used for nesting) alternate with bays, lagoons and the estuaries of salmon rivers and streams (used for feeding) (Lobkov and Neufeldt 1986). Inland-nesting birds occur near rivers or lakeshores, where there are stands of mature riparian trees (poplar, *Chosenia* or willow in the north, larch and spruce further south), and they build their nests in sites with good visibility, including tall trees in river valleys, forested mountain slopes and cliff ledges (Lobkov and Neufeldt 1986). The distance between the feeding grounds and nesting sites may vary from 0.5 to 5.0 km, but sometimes is as far as 8.0 km (Lobkov and Neufeldt 1986). Most pairs in Magadan and around the northern Sea of Okhotsk nest on the sea coast or near estuaries (67% out of c.280 nests), and the same trend is found on the rocky eastern side of Kamchatka; but on the flatter western side, more pairs nest inland than on the coast (Lobkov and Neufeldt 1986). Potapov *et al.* (2000b) provided an analysis of the habitat preferences of the species.

In midwinter, birds in Russia tend to remain along the seashores, especially in areas where wide rocky littoral beds are exposed at low tide, or alongside the edge of the ice (Lobkov and Neufeldt 1986). They are often found over sea-ice in Japan (e.g. Brazil 1991) and in north-east China (Yang Xingjia *et al.* 1991). Wintering birds in Japan mainly stay near water (on the coast and near estuaries and lakes) (Morioka *et al.* 1995). When not fishing, they need tall trees for roosting (Kanai *et al.* 1991). Satellite-tracking studies found that this species mainly stayed by rivers in autumn, probably because of the abundance of dead salmon in the rivers after spawning, and in winter some stayed near the rivers but most moved to the sea-coast or to lakes (Ueta *et al.* in prep.; also Shiraki 1996). Seven of the 20 eagles tracked in winter on Hokkaido stayed in mountainous areas, where they were presumably scavenging the carcasses of deer killed by hunters (Ueta *et al.* in prep.).

Food The species takes both live prey and carrion, and its distribution and abundance in Russia is closely related to the availability of its main food, salmon *Onchorhynchus*, but its diet may also include reindeer carcasses, birds, polar foxes, ground squirrels, stranded sea mammals and even molluscs (Brown and Amadon 1968, Lobkov 1978, 1986, Brazil and Hanawa 1991, Ladyguin 1995; see Utekhina *et al.* 2000). It habitually perches 5–30 m above water on a tree or rocky ledge, and swoops down in a dive to catch a fish; it also circles 6–7 m above the water and dives down, or stands in shallow water, on a sandbank, spit or ice-flow, from which it catches prey (del Hoyo *et al.* 1994). The spring diet in Koryakia includes Willow Grouse *Lagopus lagopus*, Black-billed Magpie *Pica pica*, Northern Pintail *Anas acuta*, Herring Gull *Larus argentatus* and seal cubs (Belopol'skiy and Rogova 1947, Kishchinskiy 1980). In eastern Kamchatka, salmon start to run in May, and on the Sea of Okhotsk coast by mid-June, and they are available as food for the eagles until December and October respectively (Moellers *et al.* 2000). The eagles nesting on the sea coast frequently prey on colonial-nesting auks, and congregations of tens of eagles are often found near seabird colonies in spring, before the salmon arrive (Moellers *et al.* 2000). On the lakes in the lower Amur drainage, the diet is mainly composed of four fish species, *Parasilurus asotus*, *Esox reicherti*, *Carassius auratus* and *Pseudobargus fulvidraco* (Masterov 1998). In late summer, especially when dying salmon drift downstream, the birds aggregate along the middle reaches of rivers, and watch for prey from a low perch, or rob other raptors (including conspecifics) (Moellers *et al.* 2000). In late autumn and early winter, the eagles may gather in hundreds to feed, for example on the Yama and Chelomdzha rivers in Magadan (I. G. Utekhina *in litt.* 1997). The exceptionally large, strongly curved bill of the Steller's Sea-eagle is adapted to ripping and tearing large carcasses into small pieces that are easy to swallow (the fish that are its main food sometimes weigh 6–7 kg, similar to the eagle's own weight); the species often congregates in large groups on the wintering grounds, with strong competition between individuals for food, and their large bills allow them to consume large quantities of food very rapidly (Ladyguin 2000).

Wintering birds in Primorye feed on salmon that have finished spawning and also on animal waste near fur farms and meat factories (Shibnev 1981). In Hokkaido, Steller's Sea-eagles sometimes feed on dead salmon in rivers, and their numbers may fluctuate with the availability of dead fish (Shiraki 1996), but most of the ascending salmon are currently caught by fishing traps, so very few are left for the eagles (Ueta and Koita 1996). In spring, the eagles sometimes catch "dace" ascending the rivers of northern Hokkaido (Shiraki 1996). At lakes Furen-ko and Abashiri-ko in eastern Hokkaido, they feed on waste fish (non-commercial species) discarded by fishermen practising under-ice fishing, mainly *Myoxocephalus brandti* at Furen-ko and *Tribolodon hakonensis* at Abashiri-ko, but the amount of waste fish available to the eagles is decreasing or fluctuates (Ueta *et al.* 1996). Other fish taken include Alaskan pollock *Theragra chalcogramma*, plus *Hypomesus olidus* and *Eleginus gracilis*; swans, ducks, gulls and seals are also eaten (Brazil 1991). In recent years many eagles have been found to feed on dead sika deer *Cervus nippon* in the upper reaches of the Shari-gawa river (WGWESSE 1996). One bird seen on Tori-shima island in the Izu islands in February 1930 was feeding on

Short-tailed Albatrosses *Phoebastria albatrus* (see relevant account) which were “unable to fly out of the crater of the volcano” (Austin and Kuroda 1953).

Breeding Steller’s Sea-eagles reach maturity and start to breed when they are 6–7 years old (Babenko *et al.* 1988b). Nest-building may begin as early as late February in Kamchatka or late March along the Sea of Okhotsk coast, and usually there are two or three nests within a home range which are built up and used in alternate years (Lobkov and Neufeldt 1986). On Kamchatka, most nests (47.9%) are built in stone birch *Betula ermanni* trees, and some in poplars (37%) and larches (4.7%) (Lobkov and Neufeldt 1986); on the Sea of Okhotsk coast the majority of nests are found in larches and some in poplars and on rocks, and further south larch is also the preferred nesting tree (Smirenskiy and Mitschenko 1980; also Hanawa *et al.* 1989). Nests on trees are located 5–20 m above ground, and those on rocks near the Sea of Okhotsk are at 15–150 m (AVA). As nests are built up over the years, they eventually become too heavy, and fall down and break through the tree canopy, sometimes with the chicks (Lobkov and Neufeldt 1986). Of the pairs that hold territories, show breeding behaviour and build up the nests, only 34–67% lay eggs in any one year (I. G. Utekhina *in litt.* 1997). On Kamchatka, the egg-laying period lasts from mid-April to late May, and the incubation period lasts 38 days (Babenko *et al.* 1988b). The clutch size (in Kronotsk State Reserve) is 1–3 eggs (1.93 on average, $n = 16$), hatching occurs from mid-May to mid-June, and chicks leave the nests by mid-August to early September (Lobkov and Ladyguin 1989). In Kronotsk State Reserve, the average breeding success was 0.65–0.95 fledglings per nest (Lobkov and Ladyguin 1989), while pairs on the Sea of Okhotsk coast raised 1.56 chicks per nest ($n = 18$), and those in the interior valleys 1.24 chicks per nest ($n = 34$) (Potapov *et al.* 1995). The oldest chick in the brood eats first, and sometimes the chicks fight over food (Hanawa *et al.* 1989).

Migration On the Kamchatka peninsula, most birds are resident throughout the year (Lobkov and Neufeldt 1986), but only a few winter on the coast of the Sea of Okhotsk (AVA), and several tens on northern Sakhalin (Nechaev 1991) and in the lower Amur drainage (Roslyakov 1981b). Some birds move from the breeding range to wintering areas on Hokkaido, southern Primorye and the Ussuri river valley (Lobkov and Neufeldt 1986). The wintering birds on Hokkaido arrive along two different migratory routes, via Sakhalin and via the Kuril islands (Nakagawa 1991). They arrive on Hokkaido in early November, exceptionally in late October, and remain until late March in northern and eastern Hokkaido (Brazil 1991). According to the results of satellite-tracking in 1995 and 1996, and some ground observations, the eagles wintering on Hokkaido migrate back along the north coast of Hokkaido (Wakkanai) to the southern tip of Sakhalin, then travel along Sakhalin and fly from its northern tip across the sea to the mouth of the Amur river (Ueta *et al.* 2000). The eagles wintering on the southern Kuril islands mostly follow the same Hokkaido–Sakhalin route in spring and autumn, but one of the nine satellite-tracked birds migrated through the Kuril islands to Onecotan island south of the Kamchatka peninsula (Ueta *et al.* 2000). These satellite-tracking studies showed that the period of migration of adult birds (21–25 days) was significantly shorter than that of the immature birds (31–61 days), presumably because the adult eagles needed to reach their summering ground early in order to secure breeding territories, while the immature birds were avoiding reaching the summering grounds when the sea and lakes there were still covered with ice (making fishing much more difficult) (Ueta *et al.* 2000). In 1997 and 1998, McGrady *et al.* (2000) used satellite-tracking to study the post-fledging movements of young birds, and found that many of them stay at pre-migration sites for 1–4 weeks; they took 5–116 days to reach their initial wintering destinations, and migrated at an average rate of 51.3 km/day (SD = 56.0); and birds from Magadan and Amur migrated down the western edge of the Sea of Okhotsk, and birds reared in Kamchatka eventually moved into the Kuril islands.

THREATS *Habitat loss* In eastern Siberia this species is being affected by habitat alteration through the development of hydro-electric power projects; moreover, proposed large-scale

coastal developments for the petrol industry and large-scale logging for the timber industry may place further pressure on its habitats (de Meulenaer and Vaisman 1996). A decline in its numbers has already been noted in the parts of northern Sakhalin where oil and gas are being exploited (V. A. Nechaev *in litt.* 1997, Masterov *et al.* 2000), and some large trees suitable for nesting are cut for fuel in winter by reindeer herders on Sakhalin (Blokhin 1998b). In the Khabarovsk region, large trees near waterbodies (rivers, lakes and the sea coast) have been destroyed by recent fires (B. A. Voronov *in litt.* 1997), and on the south-west coast of the Sea of Okhotsk variable recreational activities and industrial development projects, including gold-mining, oil-drilling and fishing, are threatening the eagle's habitat (Masterov 1998).

Disturbance Steller's Sea-eagle is one of the largest of all raptor species, and it is easily energetically stressed and thus unwilling to tolerate more than 5–6 forced flights a day caused by human disturbance (Masterov 1998), which may be the reason that it usually avoids human settlements. On Sakhalin, it has been found that the proportion of abandoned nesting sites has increased in the areas where human activity has increased (Masterov and Zykov 1992). In Magadan, the intensification of river traffic (of boats with outboard motors) is considered to be a problem (I. G. Utekhina *in litt.* 1997, AVA).

Reduction in food supply On the large salmon rivers near Magadan, the species's population could soon collapse, following the overharvesting of salmon runs in 1995–1997, and this is also likely to be a problem elsewhere on the coast and large rivers of the Sea of Okhotsk (I. G. Utekhina *in litt.* 1997, AVA). In Khabarovsk it is feared that the fish-spawning grounds could become exhausted (B. A. Voronov *in litt.* 1997). In Primorye, some of the fur farms where wintering eagles used to feed on waste have recently closed down, and some of the remaining fur farms have started to recycle the waste, which has deprived the eagles of one of their sources of food (Yu. N. Nazarov *in litt.* 1997). If food availability in the wintering ground is low, the breeding success of the eagles will also be lower, and some of the eggs laid may be unfertilised (Lobkov 1992). The wintering population on Hokkaido relies heavily on waste fish discarded by the major fisheries. Its distribution there has already changed in response to changes in fishing activities (see Population), and future changes are likely to continue to affect it.

Persecution On Kamchatka, some eagles have been shot by fur hunters because they have taken animals from traps (Lobkov 1987–1988). Three Steller's Sea-eagles were shot on Hokkaido in 1995, and such illegal hunting may be a significant threat to its population there (Ueta *et al.* 1996).

Trade In the mid-1990s, there were concerns that the wild birds collected by Zoolex, the former state-owned but now privately run animal trading company in Russia, seemed to exceed the number required to establish a viable captive population of this species (de Meulenaer and Vaisman 1996). Some Russian field experts have expressed serious concern about the prospect of regular and prolonged collection of chicks and eggs from the Steller's Sea-eagle breeding population, particularly as disturbance to the nest is believed to affect the breeding success of the pair adversely (de Meulenaer and Vaisman 1996). The Zoolex company may no longer exist, but other animal trading companies that have replaced it put constant pressure on the local Nature Protection Agency in Magadan to allow trade in this species (AVA), and some chicks have been captured (I. G. Utekhina *in litt.* 1997, AVA).

Increased predation On Sakhalin, the high density of crows (presumably increased by human activities) is a threat to the eggs of eagles (Blokhin 1998b).

Pollution and poisoning Offshore oil development is a potential threat in the Magadan region (I. G. Utekhina *in litt.* 1997, AVA). It has been reported that there are high levels of airborne DDT/DDE and PCBs in Khabarovsk and Magadan, which may affect the eagles (*World Birdwatch* 21,2 [1999]: 4). In Primorye, eagles have been poisoned by fish taken from water polluted by industrial waste (Yu. N. Nazarov *in litt.* 1997). The increasing tendency of

the wintering eagles on Hokkaido to move inland and scavenge on sika deer, because of changes in the availability of fish (see Ecology), has exposed them to a high risk of lead poisoning through ingestion of lead shot (Kurosawa 2000; also Iwata *et al.* 2000). In 1997–1998, Kushiro Zoo collected 12 dead eagles, six of which had lead pellets in their stomachs (Y. Fujimaki *in litt.* 1998). If current rates of poisoning continue, the population of Steller's Sea-eagles will be halved within c.50 years (M. Ueta verbally 1999).

MEASURES TAKEN *Legislation* Steller's Sea-eagle is included in the Russian Red Data Book (Kolosov 1983). In Japan it was designated as a Natural Monument on 23 January 1970 (Kato *et al.* 1995), and it has been protected as a National Endangered Species since 1993. It is also on the Red List of Japan, which means that its conservation importance is recognised and it can be used as a reference species in environmental impact assessment for development projects (Environment Agency of Japan *in litt.* 1999). It is included in the South Korean national Red Data Book. It is a Nationally Protected Species (First Class) in China (Conservation Division, Ministry of Forestry of China 1994). It is listed on Appendix II of CITES, and on Appendix I of the CMS (Bonn Convention, for which see Boere 1991).

Protected areas In Russia its population is protected and monitored in several protected areas, including: (*Magadan*) the Magadan State Reserve, Kronotski State Reserve and Kava Wildlife Refuge; (*Khabarovsk*) Orlik and Udył' Wildlife Refuges and Dzhugdzhurskiy, Shantarsky and Komsomol'ski Nature Reserves; (*Sakhalin*) Poronayskiy Nature Reserve; (*Kuril islands*) Kuril'ski Nature Reserve (AVA, B. A. Voronov *in litt.* 1997, Yu. N. Nazarov *in litt.* 1997). The main wintering grounds of this species on Hokkaido, Shiretoko and Furen-ko, are designated as National Wildlife Protection Areas (Environment Agency of Japan *in litt.* 1999).

Research Many studies have been conducted on this species in Russia and Japan (see, e.g., Ueta and McGrady 2000).

MEASURES PROPOSED *Habitat protection* The wintering grounds of Steller's Sea-eagle in Japan are already industrially developed, and similar developments are underway and planned for parts of its breeding and non-breeding ranges in Russia. Careful consideration and mitigation of the impacts of such developments (e.g. offshore development projects: I. G. Utekhina *in litt.* 1997, AVA) on the environment are required to minimise their negative effects on the population of this (and other threatened) species. The establishment of new reserves to protect the important salmon spawning grounds that this species relies on for food is vital for its conservation in Russia, notably those between P'yagina cape, near Yapon cape (Magadan) and the Inya river estuary (Khabarovsk) (I. G. Utekhina *in litt.* 1997, AVA), and along the Tugur, Dzhapi and Ul rivers, and the basins of lakes Udył', Mukhtel, etc. in Khabarovsk (B. A. Voronov *in litt.* 1997). The creation of winter refuges has been proposed for this species (Krechmar and Shibnev 1989), and in Primorye it has been suggested that special protected areas should be established where the main concentrations of large raptors occur (Shibnev 1981, Shibnev and Glushchenko 1988, Krechmar and Shibnev 1989).

Fisheries management In order to protect the food supply of the eagles, it is proposed that salmon fishing should only be allowed on certain sections of coast and lagoons, and should be prohibited on the rivers that flow into the Sea of Okhotsk (I. G. Utekhina *in litt.* 1997, AVA). Salmon traps in some Hokkaido rivers should be removed, to allow salmon to spawn naturally in the wild, which would provide many more dead salmon for the eagles (Ueta and Koita 1996).

Prevention of lead poisoning On Hokkaido, measures are needed immediately to control the source of lead poisoning, initially by removing the carcasses of deer shot by hunters, and ultimately by using lead-free or copper bullets; at present only c.3% of deer hunters use copper ammunition, but the Environment Agency of Japan is/was planning to ban the use of lead bullets for deer hunting by 2001 (Kurosawa 2000).

Artificial feeding In some wintering areas, special feeding sites could be established for the eagles, using waste products from fish and meat factories (Krechmar and Shibnev 1989). The establishment of artificial feeding may be appropriate for the wintering population on Hokkaido, perhaps using waste products from the fishing and other industries, particularly to help reduce the incidence of poisoning of eagles by lead shot (but see also below).

Research The species is potentially vulnerable to many of the environmental changes taking place or planned within its range, and the effects of human activities on its numbers and breeding success need to be carefully monitored in the future. Sampling of the environment and the eagles is required for DDT/DDE and PCBs in Khabarovsk and Magadan, and for lead in Japan (*World Birdwatch* 21,2 [1999]: 4). More study is needed of the ecology of breeding and wintering birds, to determine whether there are important patterns in habitat and/or other resource use; for example, birds that depend largely on carrion may have different breeding success to those that kill their food, and birds on sea coasts may show similar differences compared to those inland; moreover, there may be significant differences in resource use by age.

Conservation education Education of local people is required in the need to protect Steller's Sea-eagle (Shibnev 1981, Shibnev and Glushchenko 1988, Krechmar and Shibnev 1989). If there is no change in the law, a campaign will be needed to persuade hunters on Hokkaido to switch from lead to non-toxic shot.

Captive breeding The benefits of captive breeding for the conservation of this species are not clear, and the capture of wild birds for this is feared to be having a negative effect on its conservation status (see Threats). The captive breeding of this species requires careful monitoring, and as a minimum an EEP studbook and breeding plan are required to assist in the process (de Meulenaer and Vaisman 1996). Controls need to be established on the export of eagle chicks (I. G. Utekhina *in litt.* 1997, AVA).