Threatened Birds of Asia:
The BirdLife International Red Data Book

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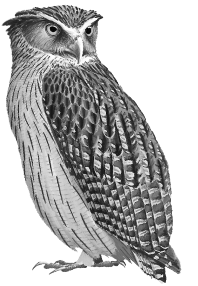


BLAKISTON'S FISH-OWL
Ketupa blakistoni

Critical □ —
Endangered ■ C1
Vulnerable □ A1c,d; A2c,d; D1

This owl has a very small, declining population because of widespread loss of riverine forest, increasing development along rivers and dam construction. It therefore qualifies as Endangered.

DISTRIBUTION Blakiston's Fish-owl is endemic to North-East Asia, where it is found in the Russian Far East, north-east China and northern Japan, and it presumably also breeds in northern parts of North Korea (although there are as yet no records) (Mikhailov and Shibnev 1998).

■ ***RUSSIA*** It is found in the coastal mountain ranges of eastern Siberia, near to the Sea of Okhotsk and the Sea of Japan and in the Amur Basin (in Magadan, Khabarovsk, Jewish Autonomous Region and Primorye), and on Sakhalin island and the southern Kuril islands. Pukinskiy (1993) suggested that it also breeds in western Kamchatka, but there appears to be no published evidence to support this (AVA). Records (by province) are as follows:

■ ***Magadan*** **Nayakhan river**, c.550 km north-east of Magadan, two birds trapped, 1986 and 1996 (I. G. Utekhina *in litt.* 1999); middle reaches of the **Yana river**, juvenile birds shot by a hunter, August 1999 (AVA); **Uptar river**, 40 km north of Magadan, bred in the early 1950s (Vas'kovskiy 1956); middle and lower reaches of the **Chelomdzha river**, 100 km west of Magadan, Magadan State Reserve, 4–5 territories present every year along a 75 km stretch of river, 1982 to present (Tarkhov and Potapov 1986, I. G. Utekhina *in litt.* 1999); Yama river, 150 km east of Magadan, song heard near the mouth of the **Studenaya river**, July 1997 (E. R. Potapov *in litt.* 1999), although the species is thought unlikely to be resident along the Yama river (AVA); 72 km upstream from the mouth of the **Tauy river**, song heard, May 1984 (AVA);

■ ***Khabarovsk*** middle and lower reaches of the **Inya river**, northern Sea of Okhotsk, Okhotsk district, 350 km west of Magadan, song recorded 40 km upstream from the river mouth, July 1996 (E. R. Potapov *in litt.* 1999), several seen and heard, July 1999, local herdsmen and hunters reporting it to be "commonly seen" in the valley in winter, when 10–12 pairs were estimated to be present (AVA); **Ul'beya river**, 80 km east of Okhotsk, "signs of presence", July 1996 (E. R. Potapov *in litt.* 1999), with 5–7 pairs being "known to dwell" there (AVA); **Okhota river**, reported by local people to be "fairly common" in winter (unspecified years) (E. R. Potapov *in litt.* 1999); **Mukhtel' river**, lower Amur area, Sea of Okhotsk coast, 30 km south-east of Cape Wrangel, feathers found, undated (Poyarkov and Budris 1991); lower reaches of the **Konin river**, near the mouth of the Talin river, Tuguro-Chumikanskiy district, one seen, July 1989 (Voronov and Pronkevich 1991a); **Amgun' river**, Amur drainage, "rare" breeding bird, undated (Vorob'ev 1954, B. A. Voronov *in litt.* 1997); **Yarku river** (Yarou river), Amur drainage, "rare" breeding bird, undated (Vorob'ev 1954, B. A. Voronov *in litt.* 1997); **Goryun river** (Gorin river), Amur drainage, "rare" breeding bird, undated (Vorob'ev 1954, B. A. Voronov *in litt.* 1997); lower **Khungari river**, undated (Mikhailov and Shibnev 1998); Udomi river (not mapped), a tributary of the Gur river, one or two accidentally captured each year in traps set by hunters (A. Antonov verbally 2000); middle and lower reaches of the **Anyuy river**, Nanaysky district, near its confluence with the Tormasu river, "rare" breeding species, one seen, July 1981 (B. A. Voronov *in litt.* 1997), 50 km upstream from the mouth, seen and song heard, late July 1993, in riverine forest (P. Barthel *in litt.* 1998); **Kur river**,

Amur drainage, "rare" breeding bird, undated (Vorob'ev 1954, B. A. Voronov *in litt.* 1997); **Urmi river**, Amur drainage, "rare" breeding bird, undated (Vorob'ev 1954, B. A. Voronov *in litt.* 1997); lower reaches of the **Koppi river**, Sea of Japan coast, July–August 1966 (B. A. Voronov *in litt*. 1997, Surmach *et al*. in press); lower reaches of the **Botchi river**, Sea of Japan coast, July–August 1966 (B. A. Voronov *in litt*. 1997, Surmach *et al*. in press); middle reaches of the Khor river, Lazo district, 1 km below the mouth of the **Chuken river**, "rare" breeding species, one seen, July 1978 (B. A. Voronov *in litt.* 1997); Okotu river (untraced), Amur drainage, "rare" breeding bird, undated (Vorob'ev 1954, B. A. Voronov *in litt.* 1997); upper Kava river (not mapped), several breeding pairs in the 1980s (V. Aksenov *per* AVA);

■ ***Jewish Autonomous Region*** middle reaches of the **Pompeyevka river**, probably breeding, "duet singing" heard, May 1976 (Smirenskiy and Smirenskaya 1980).

■ ***Primorye*** **Samarga river**, eastern slopes of the Sikhote-Alin', recorded breeding in 1908 (Surmach 1997); **Alchan river**, tributary of the Bikin river, undated (Pukinskiy 1993, Mikhailov and Shibnev 1998); **Bikin river**, from c.10 km upstream from Verkhniy Krasnyy Pereval village upstream to the mouth of the Zeva river, one of the species's main strongholds (Pukinskiy 1973), where breeding pairs have been recorded in different years at 25–30 sites (Mikhailov and Shibnev 1998), including the mouths of the Chantofu, Olonki, Dunguza, Metohezy and Zeva rivers (unspecified years) (Pukinskiy 1993), the Bol'shaya Muziza river (May 1992), Svetlovodnaya river (at Ulunga, June–July 1993, 1995 and 1996) and Bol'shaya Svetlovodnaya river (at Biomo, June 1993), the Dunguza–Nyelo–Sangeli sites (near Rodnikovaya, June 1992 and May–June 1993), and reported by local hunters at the mouths of the Takhalo and Amba rivers (unspecified years) (Mikhailov and Shibnev 1998, including a map of nest sites; also Shibnev 1963, Mikhailov *et al*. 1997); **Kamenka estuary**, 25 km south of the Svetlaya estuary, eastern slopes of the Sikhote-Alin', one heard calling near the coast, June 1996 (Mikhailov *et al*. 1997); **Iman river** (Bol'shaya Ussurka river), "common" breeding bird throughout the basin, 12–15 pairs along 100 km of the lower reaches, in the 1930s (Spangenberg 1940), but becoming "very rare" there in recent decades (Pukinskiy 1993, Mikhailov and Shibnev 1998), although seven occupied territories were found, 1996–1997, and a population of up to 20 breeding pairs then estimated (S. G. Surmach *in litt.* 1999); **Tun'sha river**, August 1961 (specimen in ZMMSU); **Sitsa river** (Sitse river), Ternei bay, "occasional visitor", two collected, 1956 (data *per* AVA); headwaters of the **Ussuri river**, one found dead in a trap, undated (Randla 1971); **Barabashevka river**, near to the Sidimi and Nizhneye Adimi rivers, collected in 1990 (S. G. Surmach *in litt*. 1999); **Sedimi river** (Narva) and **Nizhneye Adimi** (Adimi river, Poyma), extreme south of Primorye, five collected, before 1910 (Taczanowski 1891–1893, Chersky 1915, Panov 1973), but vanished by the end of the 1960s (Nazarenko 1971, Panov 1973);

■ ***Sakhalin*** southern and central parts as far north as 49°N (Takahashi 1937, Nechaev 1991), and on the **Tym' river**, undated (Ivanov 1976); near **Makarov** (Siritoru, Siritori bay), collected, undated (Gizenko 1955); **Lazo** village, collected, undated (Gizenko 1955); **Nayba river mouth** (Naibuti river), territorial bird, July 1947 (Gizenko 1955);

■ ***Kuril islands*** **Nochka river**, Kunashir island, up to 13 birds recorded along a 6–7 km stretch of river during winter counts in 1981–1985 (Voronov and Zdorikov 1988); **Saratovskaya river**, north-east Kunashir island, evidence of probable nesting, July 1982 (Nechaev and Kurenkov 1986), with two territories located and one nest found, 1987 (Dykhan and Kisleyko 1988), four seen fishing along a 5–7 km stretch of valley, March 1985 (Voronov and Zdorikov 1988); **Tyatina river**, Kunashir island, 3–5 birds recorded along a 20 km stretch of river during winter counts in 1981–1985 (Voronov and Zdorikov 1988), two nests, 1987 (Dykhan and Kisleyko 1988); Kamyshovaya river, **Kunashir island**, 1–2 birds recorded along a 10 km stretch of river during winter counts in 1982–1985 (Voronov and Zdorikov 1988), nest found, 1987 (Dykhan and Kisleyko 1988); **Filatovka river**, near Lagunnoe lake, Kunashir island, probably breeding, several seen, June–July 1987 (A. A. Kisleiko in Ilyashenko *et al.*

1988); between **Yuzhno-Kuril'sk** (Furukamappu) and Tschinomizi villages, Kunashir island, nest with one chick found, April 1930 (Bergman 1935); **Andreyevka river mouth**, Cape Chetverikova, Kunashir island, feathers found, June–July 1986 and June 1987 (Ilyashenko *et al.* 1988); Inemusiri bay, **Shikotan island**, August 1948 (Gizenko 1955); Iturup island, unconfirmed report of nesting, undated (Gizenko 1955, Nechaev and Fujimaki 1994).

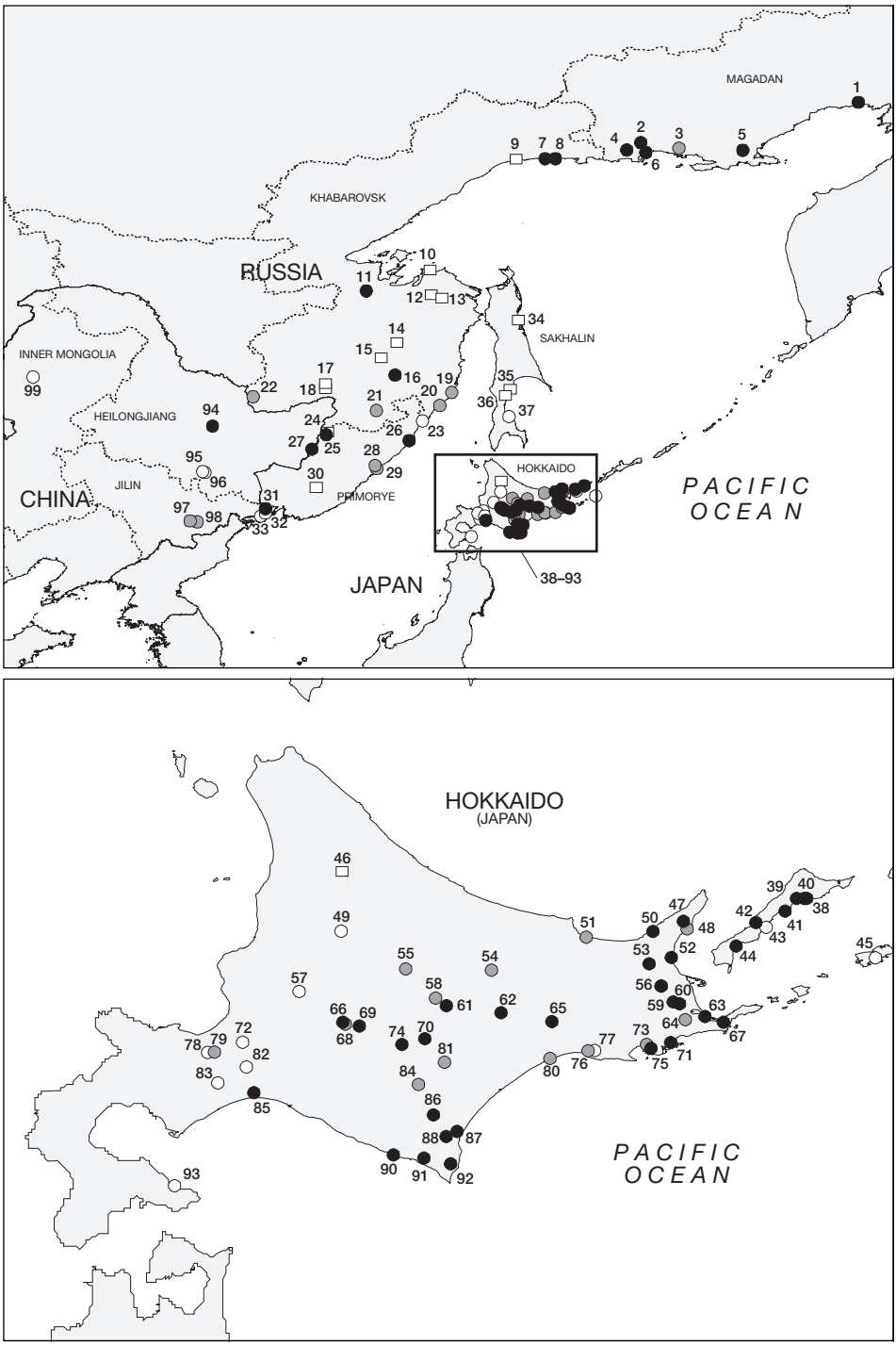
■ ***JAPAN*** Blakiston's Fish-owl is confined to the northern island of Hokkaido. It is thought to have been widespread throughout Hokkaido until the eighteenth century (Y. Fujimaki *in litt*. 1998), but it is now found only in four or five fragmented areas in the eastern and central parts of the island (Takenaka 1998), having disappeared from the western part of the island in the 1950s and the Ishikari plain in the early 1980s (see maps in Hayashi 1999). Its current range in eastern and central Hokkaido includes: Urakawa-gun, Samani-gun and Erimo-cho in Hidaka district; Furano and Minamifurano-cho in Kamikawa district; Hiroo-gun, Taiki-cho, Shintoku-cho, Shikaoi-cho, Kamishihoro-cho and Ashoro-cho in Tokachi district; Hamanaka-cho and Shibecha-cho in Kushiro district; Bekkai-cho, Naka-shibetsu-cho, Shibetsu-cho and Rausu-cho in Nemuro district; and Shari-cho in Abashiri district; its current status at Kamikawa-cho in Kamikawa district and Oketo-cho in Abashiri district is unclear (Y. Fujimaki *in litt*. 1998). Records are as follows:

Hokkaido **Bifuka-cho**, Nakagawa-gun, Kamikawa, one collected, before June 1962 (Hayashi 1999); **Rausu-cho**, Menashi-gun, Nemuro, one collected at Misaki-machi, May 1972, male collected at Misaki-machi, June 1978, one collected at Misaki-machi, September 1981, male and female collected, September 1981, one collected at Kaigan, May 1984, female collected, October 1986, male collected at Misaki-machi, October 1987, one taken into captivity at Kaigan, January 1989, two males collected, January and May 1995 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Rausu-gawa** river, one collected, 1954 (Hayashi 1999); Kenbuchi-cho, **Kamikawa-gun**, Kamikawa, January 1905 (Hayashi 1999, specimen in YIO), but current status unclear in Kamikawa-cho (Y. Fujimaki *in litt*. 1998); **Shari-cho**, Shari-gun, Abashiri, female taken into captivity, September 1980 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Kitahama**, Rausu-cho, female collected and two males taken into captivity, December 1971 (Hayashi 1999); **Kumbetsu** (Kunbetsu), Sibetsu-cho, one collected, May 1979 (Hayashi 1999), with unspecified site in Sibetsu-cho, July 1966 (Hayashi 1999) and the species still present in the area (Y. Fujimaki *in litt*. 1998); **Shibetsu-cho** (Sibecha-cho), Shibetsu-gun, Nemuro, one collected at Aza-chashikotsu, February 1973, female collected, December 1986, male collected, May 1992, male collected, October 1993 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Oketo-cho**, Tokoro-gun, Abashiri, one collected, 1973 (Hayashi 1999), current status unclear (Y. Fujimaki *in litt*. 1998); **Taisetsu-zan**, Taisetsu mountains, Kamikawa-gun, one collected, 1931, one collected, c.1955 (Hayashi 1999, specimen in YIO), current status unclear (Y. Fujimaki *in litt*. 1998); **Naka-shibetsu-cho**, Shibetsu-gun, Nemuro, one collected at Musa, January 1975 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); Shin-totsukawa-cho, Kabato-gun, **Sorachi**, one collected, 1937 (Hayashi 1999); **Horoka-yama**, Tokachi (Tokachi-horoka), July 1970 (Hayashi 1999, specimen in YIO); **Bekkai-cho**, Notsuke-gun, Nemuro, single birds taken into captivity at Odaito, January 1976 and December 1987 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Nishibetsu** (Nizibetsu), Sibecha-cho, male collected, July 1981 (Hayashi 1999); **Kamishihoro-cho**, Kato-gun, Tokachi, currently present (Y. Fujimaki *in litt*. 1998); **Ashoro-cho**, Ashoro-gun, Tokachi, subadult female taken into captivity, July 1988, once collected, September 1992 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Furen-ko** lake, frequently recorded (SC), e.g. four seen, February 1988 (G. Ouweneel *in litt.* 1999); **Furen** (Fuuren) bridge, Nemuro city, one collected, October 1973 (Hayashi 1999); **Akan-cho**, Akan-gun, Kushiro, male taken into captivity, December 1979, two males collected, February 1985 (Hayashi 1999); **Furano**, currently present (Y. Fujimaki *in litt*. 1998); **Nemuro-**

gun (Nemuro city), one taken into captivity at Higashi-ochiishi, February 1986, one collected at Nishi-ochiishi, undated (Hayashi 1999), female collected, April 1986, male collected, October 1990, male collected, August 1992, two males and a subadult female taken into captivity, July 1979, February 1981 and May 1990 (Hayashi 1999), pair seen, November 1998 (A. Chartier *in litt.* 1999); **Yamabe**, Furano city, one collected, 1960s/1970s (Hayashi 1999); **Minamifurano-cho**, Sorachi-gun, Kamikawa, currently present (Y. Fujimaki *in litt*. 1998); **Shikaoi-cho**, Kato-gun, Tokachi, male collected, December 1979, one collected, December 1993 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Hamanaka-cho**, Akkeshi-gun, Kushiro, male collected, June 1973 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Nopporo**, Ebetsu-shi, female collected, March 1889 (Hayashi 1999); **Oboro-gawa** river, Kushiro, male collected, January 1935 (Kiyosu 1965), collected at Oboro, February 1956 (specimen in YPM); **Shintoku-cho**, Kamikawa-gun, Tokachi, one collected at Tomuraushi, May 1990 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Akkeshi lake**, Akkeshi-gun, Kushiro, female collected, October 1995 (Hayashi 1999); **Kushiro-shi** (Kushiro city), male collected at "Kushiro Kawakami" (presumably Kawakami-gun), January 1910, one female taken into captivity at the north wharf, November 1968, female collected at Yamahana, undated (Hayashi 1999); **Setsuri**, Kawakami-gun, female collected, December 1932 (Hayashi 1999, specimen in YIO); Toubetsu-cho, Ishikari-gun, **Ishikari** (Ishikaritoubetsu), female collected, December 1890 (Hayashi 1999); **Sapporo**, one collected, November 1881, male collected, January 1888, female collected, October 1892, male collected, June 1958 (Hayashi 1999, male in YIO); **Charo-gawa** river, Shiranuka-cho, Kushiro, 1950 (Kiyosu 1965); **Obihiro-shi** (Obihiro city), one collected, September 1967 (Hayashi 1999); **Eniwa-cho**, Chitose-gun, one collected, January 1937 (Hayashi 1999, specimen in YIO); **Shikotsu-ko** lake, spring 1929 (Hayashi 1999, specimen in YIO), January 1937 (Kiyosu 1965); **Yachiyo**, Obihiro city, one female taken into captivity, July 1963 (Hayashi 1999); Yuufutsu station, **Tomakomai-shi**, female collected, December 1991 (Hayashi 1999); **Taiki-cho**, Hiroo-gun, Tokachi, January 1933 (Hayashi 1999, male in YIO), currently present (Y. Fujimaki *in litt*. 1998); **Nozuka**, Hiroo-cho, Hiroo-gun, female collected, November 1981 (Hayashi 1999); **Hiroo-cho**, Hiroo-gun, Tokachi, one collected at Funbe, July 1971, at Yamafunbe, one collected in March 1982 and a male collected in November 1983 (Hayashi 1999), female collected at Ochozu, November 1983 (Hayashi 1999), currently present in Hiroo-gun (Y. Fujimaki *in litt*. 1998); **Urakawa-cho**, Urakawa-gun, Hidaka, one collected, March 1986 (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Samani-gun**, Hidaka, currently present (Y. Fujimaki *in litt*. 1998); **Erimo-cho**, Horoizumi-gun, Tokachi, one collected, undated (Hayashi 1999), currently present (Y. Fujimaki *in litt*. 1998); **Hakodate**, January 1887 (Koyosu 1965); Senpoku Pass (untraced), male collected, February 1970 (Hayashi 1999).

The distribution of Blakiston's Fish-owl *Ketupa blakistoni* (maps opposite): (1) Nayakhan river; (2) Yana river; (3) Uptar river; (4) Chelomdzha river; (5) Studenaya river; (6) Tauy river; (8) Inya river; (7) Ul'beya river; (9) Okhota river; (10) Mukhtel' river; (11) Konin river; (12) Amgun' river; (13) Yarku river; (14) Goryun river; (15) Khungari river; (16) Anyuy river; (17) Kur river; (18) Urmi river; (19) Koppi river; (20) Botchi river; (21) Chuken river; (22) Pompeyevka river; (23) Samarga river; (24) Alchan river; (25) Bikin river; (26) Kamenka estuary; (27) Iman river; (28) Tun'sha river; (29) Sitsa river; (30) Ussuri river; (31) Barabashevka river; (32) Sedimi river; (33) Nizhneye Adimi; (34) Tym' river; (35) Makarov; (36) Lazo; (37) Nayba river mouth; (38) Nochka river; (39) Saratovskaya river; (40) Tyatina river; (41) Kunashir island; (42) Filatovka river; (43) Yuzhno-Kuril'sk; (44) Andreyevka river mouth; (45) Shikotan island; (46) Bifuka-cho; (47) Rausu-cho; (48) Rausu-gawa; (49) Kamikawa-gun; (50) Shari-cho; (51) Kitahama; (52) Kumbetsu; (53) Shibetsu-cho; (54) Oketo-cho; (55) Taisetsu-zan; (56) Naka-shibetsu-cho; (57) Sorachi; (58) Horoka-yama; (59) Bekkai-cho; (60) Nishibetsu; (61) Kamishihoro-cho; (62) Ashoro-cho; (63) Furen-ko; (64) Furen; (65) Akan-cho; (66) Furano; (67) Nemuro-gun; (68) Yamabe; (69) Minamifurano-cho; (70) Shikaoi-cho; (71) Hamanaka-cho; (72) Nopporo; (73) Oboro-gawa; (74) Shintoku-cho; (75) Akkeshi lake; (76) Kushiro-shi; (77) Setsuri; (78) Ishikari; (79) Sapporo; (80) Charo-gawa; (81) Obihiro-shi; (82) Eniwa-cho; (83) Shikotsu-ko; (84) Yachiyo; (85) Tomakomai-shi; (86) Taiki-cho; (87) Nozuka; (88) Hiroo-cho; (89) unallocated; (90) Urakawa-cho; (91) Samani-gun; (92) Erimo-cho; (93) Hakodate; (94) Dailing; (95) Yabuli; (96) Shitouhezi; (97) Toudaobai He; (98) Songjiang; (99) Yakeshi.

○ Historical (pre-1950) ◍ Fairly recent (1950–1979) ● Recent (1980–present) □ Undated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■ ***CHINA*** The species is known by a handful of records from the Xiao Hinggan Ling and Zhangguangcai Ling mountains in Heilongjiang, the Changbai Shan mountains in Jilin, and the Da Hinggan Ling mountains in north-east Inner Mongolia. Its range in China now appears to be much reduced, with records (by province) as follows:

■ ***Heilongjiang*** **Dailing** (Liang-shui Nature Reserve), Yichun city, Xiao Hinggan Ling mountains, specimens collected, June 1966 and July 1983 (Chang Jiachuan *per* Yu Zhiwei *in litt.* 1997, two specimens in NEFUCN; also Deppe 1985), with c.5 pairs reported by locals as breeding in this area (Deppe 1985), but not recorded since the mid-1980s and probably extinct in the area, and possibly even from the entire Xiao Hinggan Ling range (Liu Bowen *in litt.* 1998); near **Yabuli** (Jablonja; see Remarks 1), 135 km south-east of Harbin (Charbin), Mayi He river (Maiche or Majanche), Zhangguangcai Ling mountains, one collected, December (unspecified year) (Meise 1934); near **Shitouhezi** (Schitouchetzsy; see Remarks 1), 190 km south-east of Harbin (Charbin), Mayi He river (Maiche or Majanche), one seen catching fish as dusk, February (unspecified year) (Ssamarin in Meise 1934);

■ ***Jilin*** **Toudaobai He** river, Changbai Shan mountains, Erdao township, Antu county, one collected, 1968 (Zhao Zhengjie *per* Yu Zhiwei *in litt.* 1997); Nandao He river, **Songjiang** township, Antu county, one collected, September 1978 (Zhao Zhengjie *per* Yu Zhiwei *in litt.* 1997);

■ ***Inner Mongolia*** **Yakeshi** (Jakschi, Jakeschi), female collected, June 1927 or 1929 (Meise 1934; also Kiyosu 1965).

POPULATION The global population of Blakiston's Fish-owl may be just a few hundred birds, and it is declining in Russia and China, and possibly also in Japan. Galushin (*per* S. G. Surmach *in litt*. 1999) estimated a global population of 300–400 pairs, but Pukinskiy (1993) suggested that its total population did not exceed 300–350 individuals. However, S. G. Surmach (*in litt.* 1999) has pointed out that recent surveys using questionnaires had found higher numbers of this species than had previously been estimated, and that the Russian population alone could exceed 700–800 pairs.

Russia It occurs at low densities in all parts of its Russian range, with population estimates as follows. In Magadan region there are less than 10 pairs, with a similar number on the northernmost rivers of Khabarovsk region (AVA). Along the Chelomdzha river valley in Magadan, pairs are found near the mouths of tributaries every c.10–12 km (AVA). It has disappeared from several valleys in the Magadan area because of human disturbance (Vas'kovskiy 1956). The large valleys on the south-west coast of the Sea of Okhotsk (the Ul'ya, Uda and Maya) have not been surveyed. The rivers in southern Khabarovsk (the Amgun', Kur, Anyuy and Khor) have also not been censused, but there are presumably c.50 pairs there (AVA). The population size on Sakhalin island is unknown, but it is believed to have declined as there are only a few recent records (Nechaev 1991 in Mikhailov and Shibnev 1998). On Kunashir island in the Kuril islands, 18–20 breeding pairs were counted in 1987 (Dykhan and Kisleyko 1988), and on this island breeding pairs are even found on small salmon streams only 3–5 km long (Nechaev 1969). In Primorye region, 70 birds were recorded along 250 km of the Bikin river in 1975–1976, including 26 breeding pairs (Pukinskiy 1993), but there are now no more than 15 pairs there (Mikhailov and Shibnev 1998). The current average density in the middle reaches of the Bikin river (this species's main stronghold) is 0.015 birds per km^2, or 130 km^2 per pair (Glushchenko *et al.* 1996). On the Iman (Bol'shaya Ussurka) river, 12–15 pairs were recorded along 100 km in 1938–1939 (Spangenberg 1965), but by the 1980s the species was considered to have become almost extinct there because of intensive logging and disturbance (Shibnev 1989c, Pukinskiy 1993). However, S. G. Surmach (*in litt.* 1999) located seven occupied breeding territories there in 1996–1997, and estimated a current population of no fewer than 7–10 breeding pairs and up to 20 pairs in favourable years; he considered that the population there had been 60–70 pairs in the 1930s, and that there had been a four-

fold decrease in its population. Furthermore, by using questionnaire survey techniques, S. G. Surmach (*in litt.* 1999) discovered that this species was breeding on coastal rivers flowing into the Sea of Japan, where its population was at least 50–70 pairs, and estimated its population in Ussuriland at 100–130 pairs. Its total Russian population therefore could exceed 700–800 pairs (S. G. Surmach *in litt.* 1999).

China Zhao Zhengjie (1995) estimated a total of fewer than 50 pairs in mainland China, but there is little recent information available on its status there. It has probably declined substantially, and disappeared from much of its former range, because of the rapid rate forest loss in north-east China, and Liu Bowen (*in litt.* 1998) considered that it is probably extinct in Heilongjiang.

Japan A census on this species in eastern Hokkaido (Abashiri, Tokachi, Kushiro and Nemuro) in 1975–1976 only found 29 birds, but more sites have been located since then and a total of 81 birds was estimated in Hokkaido in March 1992 (Hayashi 1999). Other estimates of the Hokkaido population were 80–100 birds (Brazil and Yamamoto 1989) and 90–100 birds (Research Center, WBSJ 1993). Takenaka (1998) estimated about 30 pairs and 60 single birds on Hokkaido, giving a total population of c.120 individuals. Y. Fujimaki (*in litt.* 1998) believed that this species was found throughout Hokkaido in the eighteenth century, but its range has since declined and it is now only found in 4–5 isolated areas on the island (Takenaka 1998). Hayashi (1999) illustrated how its range has changed since the nineteenth century, and provided evidence that it has disappeared from many former localities. Its range and numbers have therefore been in decline for the past two centuries, but it is unclear whether this decline is continuing or whether the measures taken for its protection in recent years (see below) have now allowed its numbers on Hokkaido to stabilise.

ECOLOGY ***Habitat*** In Russia, this species depends on densely forested, rather large rivers, rich in fish and with available nest sites in old, thick trees with large hollows, where it prefers secluded sites, with shallow, slow-flowing stretches of water and small peaceful backwaters, chiefly near the mouths of smaller tributaries (Mikhailov and Shibnev 1998). These types of habitats are found in lowland or mountain taiga valleys with groves of mature riverine trees (poplar, *Chosenia*, willows, elm, ash, alder and maple); the valleys are naturally divided into channels, with shallow torrents and areas of deep quiet water, and springs and shoals that do not freeze over (and therefore allow this species to feed) in winter (Shibnev 1989c, Pukinskiy 1993). On Kunashir in the Kuril islands, where the species occurs along small rivers with limited areas of riverine forest, it often nests on steep mountain slopes vegetated with mixed forests of spruce, birch and hardwoods (Dykhan and Kisleyko 1988). In Japan, it is found at altitudes from sea-level to 2,000 m, and requires rivers and lakes for fishing and large trees for nesting (c.1 m in diameter); it only nests in broadleaf deciduous trees but can be found in mixed broadleaf-coniferous forest (Research Center, WBSJ 1993). When nearby areas are logged, breeding birds tend to desert their nesting sites because of the disturbance (Research Center, WBSJ 1993). They prefer rivers and streams that do not totally freeze over in winter, but in parts of the Nemuro Peninsula by switching diet they persist in areas where all of the streams are completely frozen in winter (Research Center, WBSJ 1993).

Food Although specialised as a fish eater, this species might better be characterised as a specialised freshwater predator (although it is an occasional or seasonal predator of non-aquatic animals): on the Bikin river the diet includes amphibians (frogs, toads and salamanders make up 77% of its diet in spring and summer), invertebrates (crayfish and insects are eaten in summer), fish (pike, salmon, etc. make up 18% of its diet in summer, autumn and winter), rodents (woodland voles make up 5% of its diet in winter) and sometimes birds (in winter) (Pukinskiy 1993). On Kunashir, its diet throughout the year consists of Pacific salmon and charr (gorbusha, chum, kundzha and malma, found in 90.9% of pellets), waterfowl (Mallard *Anas platyrhynchos*, Pintail *A. acuta*, mergansers *Mergus* and Harlequin Duck *Histrionicus*

histrionicus, in 36.3% of pellets), rodents (grey rat and red vole, in 9% of pellets), shrews (4.5% of pellets), small birds (4.5% of pellets), and crustaceans (4.5% of pellets) (Voronov and Zdorikov 1988). In severe winters, birds have been observed feeding on rubbish dumps (Tarkhov and Potapov 1986, Pukinskiy 1993). In Japan, observations and pellet analysis have shown that it feeds mainly on salmon, trout, dace, sculpin and other river fishes (it feeds mainly on fish from spring to late autumn), but it also takes hares, squirrels, bats, grouse, ducks, small birds, amphibians (many frogs are taken when it is rearing the young), crayfish and other crustaceans, waterbeetles, stag-beetles and other insects (Nagada 1972, Yamamoto 1988). In winter it feeds more on small mammals and birds, especially in areas with frozen water such as the Nemuro Peninsula (Division of Nature Conservation, Department of Environment, Hokkaido 1990).

Breeding This species is usually highly sedentary and strictly monogamous; once established, a home range is occupied over many years, both in summer and in winter (Pukinskiy 1993). Pair formation occurs when birds are in their second spring, and they first breed when they are almost three years old (Pukinskiy 1993). Nesting occurs from late February to mid-March onwards, usually in holes in large hollow riparian trees (Brazil 1991, Research Center, WBSJ 1993). Nest holes were found 2–18 m above the ground (usually 6–12 m) and 20–250 m from the banks of channels (Brazil 1985c; also Nagada 1972). The clutches of 1–2 eggs are incubated by the female for 35 days, while the male guards and feeds her (Brazil 1985c). The chicks stay in the nest for 35–45 days, and remain in the natal territory for 1–1.5 months (Pukinskiy 1993; also Research Center, WBSJ 1993).

Migration Once a territory has been established, the pairs are highly resident, gaining much subcutaneous fat in autumn, which helps support them over the winter (Nechaev 1963, Pukinskiy 1993). Only in severe winters are birds forced to move elsewhere in search of food (AVA).

THREATS ***Habitat loss*** A marked decrease in the population of this large owl took place in the late 1970s to early 1980s, when it disappeared from many areas in the Ussuri drainage (where an approximately four-fold decline is estimated to have taken place over a 20-year period), mainly as a result of logging (Shibnev 1989c, Pukinskiy 1993). For example, a large part of the lower Bikin valley has been subject to logging activities (Glushchenko *et al.* 1996). Logging of riverine forests and timber rafting continue to be threats in Russia (Shibnev 1989c, Pukinskiy 1993; see Threats under Scaly-sided Merganser *Mergus squamatus*). Deforestation is probably the biggest threat to this species in China (Yu Zhiwei *in litt.* 1997; see Threats under Scaly-sided Merganser). The main reason for the decline of this species on Hokkaido has been the loss of its habitat since the 1950s; as the human population has increased, areas of forest have been converted to farmland and towns, and development along riverbanks and the construction of dams have reduced the fish stocks in the rivers (Hayashi 1999). Logging, especially of broadleaf deciduous trees, has reduced the area of suitable breeding habitat and caused considerable disturbance, and forest fragmentation means that some birds cannot move between areas of suitable habitat; the protection afforded to the forests where it nests is still inadequate, and many of these areas remain under threat (Research Center, WBSJ 1993).

Hunting and accidental trapping In Russia, this species is persecuted in winter by trappers who think that they spoil the fur of trapped animals, and some birds are occasionally caught and die in traps set in the water for mink and otters (Shibnev 1989c, Pukinskiy 1993, Mikhailov and Shibnev 1998). Some local people consider this species as an acceptable food (Mikhailov and Shibnev 1998). There is no recent evidence of it being hunted in China, probably because of its scarcity, but illegal trapping of birds is still widespread in north-east China (Liu Bowen and Lu Changhu verbally 1999).

Reduced fish stocks *Russia* Overharvesting of fish, especially salmonids, is a threat to the species (Shibnev 1989c, Pukinskiy 1993). Over the past few years, its winter prey has been

reduced in the Bikin river by intensive, year-round net-fishing (Mikhailov and Shibnev 1998), and a decline there in its average brood size from 2–3 chicks in the 1960s to 1–2 in the 1970s was probably caused by a decline in fish stocks (Pukinskiy 1993). *Japan* On Hokkaido, salmon and trout are collected at the river mouths for artificial spawning, which has reduced food availability upstream (Hayashi 1999).

Pollution River pollution is believed to be a threat to the species in Russia (Shibnev 1989c, Pukinskiy 1993).

Disturbance and increased man-related mortality In the Magadan area, it has disappeared from several valleys because of human disturbance (Vas'kovskiy 1956). Hayashi (1999) documented the cause of death of 31 birds found on Hokkaido between 1954 and 1995: all were attributable to human activities, including drowning in fishponds (usually when the birds became entangled in fishing nets) (36.8%), traffic accidents (often on bridges, where the owls perch on the railings looking for frogs) (21.1%), and electrocution by power-lines (13.2%). This type of mortality may be a serious factor in the contraction in the range of the species in parts of the island where the forests are fragmented and recolonisation is not possible. Disturbance by people during the breeding season is also a serious problem (Y. Fujimaki *in litt*. 1998).

Increased predation Predation of young fish-owls by foxes (which have recently increased in some parts of Hokkaido: Research Center, WBSJ 1993) may be a problem, and the introduced racoon is increasing in fish-owl habitat and could also become a potential predator of young birds (Y. Fujimaki *in litt*. 1998).

MEASURES TAKEN ***Legislation*** Blakiston's Fish-owl is included in the Russian Red Data Book (Kolosov 1983), and it is on the list of birds for special protection within the framework of the Russian-Japanese Convention "On the conservation of migratory birds and their habitats" (O. P. Val'chuk *in litt.* 1997). It is listed as a category II National Protected Species (Second Class) in China (Conservation Division, Ministry of Forestry of China 1994). In Japan it was designated as a "Special Bird" in 1972 (Environment Agency of Japan 1976), and as a Natural Monument on 19 May 1971 (Kato *et al.* 1995). It has been protected as a National Endangered Species since 1993, and it is 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 listed on Appendix II of CITES.

Protected areas The species is recorded from several protected areas in Russia, including the Magadanski State Reserve in Magadan (AVA), the Botchinski State Reserve and Verkhnekhorskiy Refuge in Khabarovsk, and Kuril'ski Nature Reserve in the Kuril islands (V. A. Nechaev *in litt.* 1997). In China it was recorded in the 1960s in or near the Changbai Shan National Nature Reserve (1,906 km^2, forests apparently in very good condition) in Jilin (see Distribution; protected area size and condition from MacKinnon *et al.* 1996). Shiretoko (431.72 km^2, including a "special protection area" of 193.57 km^2), the peninsula in the north-east of Hokkaido (which includes several of the Blakiston's Fish-owl localities around Rausu-cho), has been established as a National Wildlife Protection Area for the conservation of the habitat of this species and other rare wildlife (Environment Agency of Japan *in litt.* 1999).

Other measures *Japan* On Hokkaido, the supplementary feeding of fish to this species and the provision of nest-boxes began in 1984; the nest-boxes were placed in both occupied areas and in locations where this species was found in the past, and by March 1992 nest-boxes had been placed in 89 locations and were being used by the owls in 12 of these areas (Research Center, WBSJ 1993). There is also a captive breeding and release programme for the species on Hokkaido (Second announcement and invitation to the CBSG annual meeting, Yokohama, Japan, 8–11 October 1998). However, where the causes of the decline of the

species are habitat loss, this conservation measure is irrelevant, although there may be situations in which the use of captive stock may prove valuable.

MEASURES PROPOSED ***Habitat protection*** Since logging is the most serious threat to this species, the protection of riverine forest is the most important measure required for its conservation. Several proposals have been made for new reserves that would protect important areas of habitat for it in Russia. Glushchenko *et al.* (1996) and Surmach (1997) outlined a plan to create a national park with a total area of 2,965 km^2 on the Bikin river in Primorye, comprising three separate reserves, two of which are important for this species, the Srednealchanski and Poima refuges. In this new reserve, there would be limitations on human economic activity, but active scientific research and monitoring would be undertaken (Glushchenko *et al.* 1996, Mikhailov and Shibnev 1998). O. P. Val'chuk (*in litt.* 1997) has suggested that it would be sensible to extend the proposed reserve upstream to include an extra area of c.1,000 km^2. In Khabarovsk there are proposals for the creation of a nature reserve along the Anyuy river and for a system of specially protected areas in the Khor river basin (B. A. Voronov *in litt.* 1997). On Hokkaido, Japan, a recovery plan should be prepared for the natural river systems and forests (Y. Fujimaki *in litt*. 1998). The remaining areas of suitable habitat should be preserved, and in some areas its habitats could be restored (Hayashi 1999).

Provision of nest-boxes Nest-boxes have been provided for this species on Hokkaido in Japan, many of which are now in use (see Measures Taken). There is scope to provide nest-boxes in other parts of the range, for example on Sakhalin and the Kuril islands (V. A. Nechaev *in litt.* 1997). This may be particularly appropriate in areas that have been logged, where suitable nesting trees have been removed, and in other areas where the availability of nest sites is a limiting factor on the fish-owl population. It is possible that the provision of nest-boxes could significantly increase the population density in some areas, and perhaps increase breeding productivity by providing new nest sites for young pairs that would otherwise be unable to breed.

Reduction in hunting and disturbance The illegal poaching of this species should be reduced by better enforcement of existing legislation, and efforts should be made to reduce disturbance along rivers (V. A. Nechaev *in litt.* 1997). Entry to breeding areas should be restricted, and fishing should be banned on the stretches of river used by the fish-owls (Y. Fujimaki *in litt*. 1998).

Measures to reduce mortality There is evidence that many fish-owls are killed on Hokkaido as a result of human activities and development (Hayashi 1999; see Threats). Methods should be developed to reduce this type of mortality (Y. Fujimaki *in litt*. 1998), for example by changes in the design of power-lines to prevent the owls coming into contact with them and being electrocuted. Road bridges cross many fish-owls territories, and measures could be developed to discourage the birds from perching on them, and to reduce traffic speed at those points. The fish-owls are attracted to fish farms, and efforts should be made to reduce mortality by fish-owls being caught in nets and other equipment.

Research Throughout its range, Blakiston's Fish-owl needs further study to determine the factors restricting its breeding success and survival. A long-term ringing programme would help, as would radio-tracking of individuals on a year-round basis. The distribution and abundance of this species is poorly known in several parts of its Russian range, and further surveys are required to improve knowledge and help develop the most appropriate conservation measures. For example, surveys are required in the river basins along the Okhotsk Sea coast and in the lower Amur river valley (AVA), and along the rivers flowing into the Sea of Japan (S. G. Surmach *in litt*. 1999). There is also a need to monitor its populations at known sites (Surmach 1997). *China* The current status of this species in China is extremely poorly known, and surveys are required at the localities where it was recorded in the past

and in other areas of potentially suitable habitat, with the aim of identifying any surviving populations and developing appropriate conservation measures. The Changbai Shan National Nature Reserve in Jilin is an obvious place to start. On Hokkaido, the population of this species should be monitored continuously (Hayashi 1999).

Education This large, charismatic bird has considerable potential for use in public awareness and education campaigns. This will be an important factor when there is a need to explain to local people why new protected areas are being established, or why other measures affecting human activities are being taken (see Surmach 1997).

REMARKS (1) Meise (1934) gave details of two localities in Heilongjiang where this species had been recorded, "Jablonja", which appears to be modern-day Yabuli, and "Schitouchetzsy", which appears to be Shitouhezi. According to Meise, both these localities are on the river Maiche or Majanche, but Yabuli is on the Mayi He river and Shitouhezi is on the Mudan Jiang river. Either an error has been made above in matching the names used by Meise with current place names, or Meise was mistaken in saying that both "Jablonja" and "Schitouchetzsy" were on the same river.