Threatened Birds of Asia:
The BirdLife International Red Data Book

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PHILIPPINE COCKATOO
Cacatua haematuropygia

Critical ■ A1a,c,d
Endangered □ A2b,c,d; C1
Vulnerable □ C2a

This species qualifies as Critical because it has suffered an extremely rapid population reduction over the last 45 years (the estimate for three generations) owing to extensive loss of its lowland habitats and trapping for the cagebird trade.

DISTRIBUTION The Philippine Cockatoo is endemic to the Philippines, where it was once widespread (with information below indicating its occurrence on 52 islands in the archipelago) but is now probably confined to a very few islands (Dickinson *et al.* 1991); between 1989 and 1994 it was found on just eight (Lambert 1994b). It has apparently never been recorded from the Babuyanes and Batanes in the north (McGregor 1920). Islands below are listed alphabetically, and records from islands (or, for Luzon, provinces within islands) which do not specify a locality have only been included if they are the only record for the island concerned:

■ ***PHILIPPINES*** *Balabac* **Cape Melville**, November 1911 (female in MCZ); **Minagas**, Dalawan Bay, April 1962 (female in UPLB);

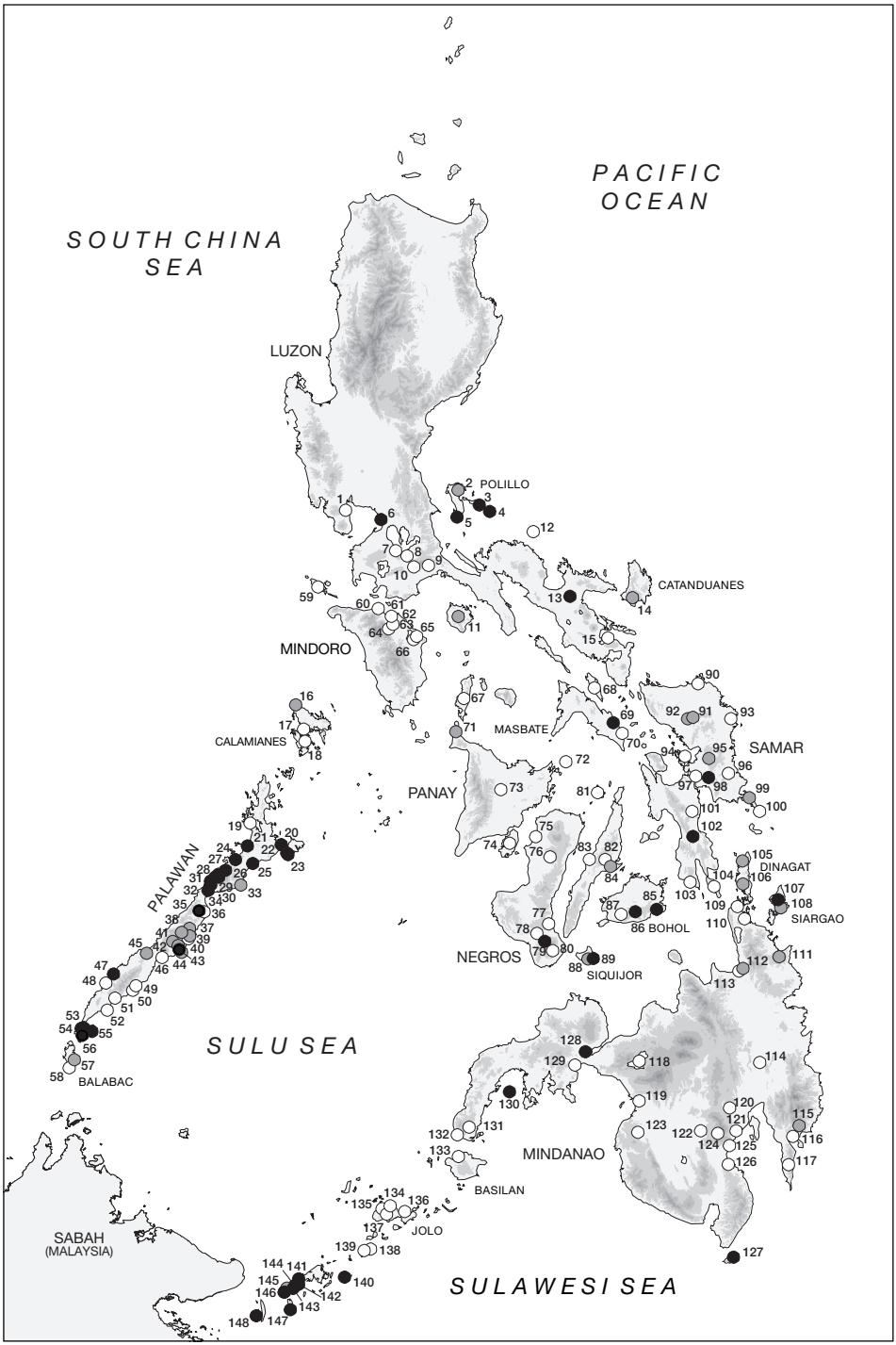
Bancalan off Palawan, August or September 1991, by reliable report (island not visited for security reasons) (Lambert 1993c, 1994b);

Bantayan **Cadapnan**, May 1948 (specimen in PNM; but described as "rare" in McGregor 1907d, 1909–1910);

Basilan **Isabela**, December 1906 to March 1907 (McGregor 1907; see also Hartert 1906, Kuroda 1927);

Bohol **Sevilla**, around April 1906 (McGregor 1907e); **Guindulman**, around May 1906 (McGregor 1907e); **Rajah Sikatuna National Park**, several times (including the report in Lambert 1994b) since 1989, up to 12 (Brooks *et al.* 1995c, T. H. Fisher *per* A. Jensen *in litt.* 1994);

The distribution of Philippine Cockatoo *Cacatua haematuropygia* (map opposite; sequence not as in text): (1) Abucay; (2) Anibawan; (3) Tapul; (4) Jomalig Island; (5) Agta-Sabang; (6) Manila; (7) Calamba; (8) Calauan; (9) Tayabas; (10) Dolores; (11) Marinduque; (12) Calagua; (13) Mt Isarog; (14) Dugui-too; (15) Manito; (16) Calauit; (17) Calamianes; (18) San Pedro; (19) Gulang-gulang; (20) Bivouac; (21) Pagdanan; (22) Lagan; (23) Bacao; (24) Port Barton; (25) Roxas; (26) Babuyan river; (27) Sabang; (28) Tumamporo; (29) Canabong; (30) St Paul's Subterranean River National Park; (31) Tagnipa; (32) Buenavista; (33) Malabusog; (34) Bahile; (35) Iwahig Penal Colony; (36) Puerto Princesa; (37) Sagpangan; (38) Kabigaan; (39) Mt Katabutabuan; (40) Tagbariri; (41) Mt Victoria; (42) Narra; (43) Panacan; (44) Rasa; (45) Babulongan; (46) Calatugas; (47) Campong; (48) Candauaga; (49) Taguso; (50) Brooke's Point; (51) Bonobono; (52) Sarong; (53) Dalahican; (54) Manas; (55) Bugsuk; (56) Malinsono; (57) Minagas; (58) Cape Melville; (59) Lubang; (60) Puerto Galera; (61) Balete; (62) Bayog; (63) Calawang; (64) Mt Dulangan; (65) Pola; (66) Subaan; (67) Tablas; (68) Ticao; (69) Banco; (70) Dumurug Point; (71) Boracay; (72) South Gigante; (73) Panay; (74) Guimaras; (75) Bacolod; (76) Mt Canlaon; (77) Pagyabunan; (78) Amio; (79) Lake Balinsasayao; (80) Mt Talinis; (81) Cadapnan; (82) Danao; (83) Toledo; (84) Cebu City; (85) Guindulman; (86) Rajah Sikatuna National Park; (87) Sevilla; (88) Capalasanan; (89) Lilo-an; (90) Catubig river; (91) Mt Capoto-an; (92) Matuguinao; (93) Oras; (94) Buad; (95) Buluan; (96) Tagaslian; (97) Silago river; (98) Sohoton; (99) Salcedo; (100) Calico-an; (101) San Pablo airstrip; (102) Balinsasayao; (103) Amparo; (104) Panaon; (105) Balitbiton; (106) Mt Kambinlio; (107) Mahayahay; (108) Osmeña; (109) Nipah; (110) Placer; (111) Sibahay; (112) Agay; (113) Butuan river; (114) Madaum; (115) Mt Mayo; (116) Mati; (117) Agustin Peninsula; (118) Lake Lanao; (119) Parang; (120) Davao; (121) Daliaon; (122) Kidapawan; (123) Maguindanao; (124) Mt Apo; (125) Santa Cruz; (126) Malalag; (127) Sarangani; (128) Tambulig; (129) Bucong; (130) Sibuguey Bay; (131) Zamboanga; (132) Ayala; (133) Isabela; (134) Taglibi; (135) Jolo; (136) Bual; (137) Siit Lake; (138) Siasi; (139) Lapac; (140) Loran; (141) Tataan; (142) Mt Binuang; (143) Bud Sicali; (144) Batu-batu; (145) Sanga-sanga; (146) Bongao; (147) Manuk Manka; (148) Tumindao.
○ Historical (pre-1950) ◍ Fairly recent (1950–1979) ● Recent (1980–present)


PACIFIC OCEAN
SOUTH CHINA SEA
LUZON
POLILLO
CATANDUANES
MINDORO
CALAMIANES
MASBATE
SAMAR
PANAY
DINAGAT
SIARGAO
PALAWAN
BOHOL
NEGROS
SIQUIJOR
SULU SEA
BALABAC
MINDANAO
BASILAN
JOLO
SABAH
(MALAYSIA)
SULAWESI SEA

Bongao July 1893 (Sharpe 1894a) and recently (Tabaranza 1992);
Boracay April or May 1970 (Alcala and Alviola 1970);
Buad June 1910 (Parkes 1965);
Bugsuk off Palawan, August or September 1991 (Lambert 1993c);
Busuanga by local report, 1990s (Lambert 1994b);
Calagua Islands without locality or date (von Martens 1866);
Calamianes without locality or date (Bourns and Worcester 1894);
Calauit without locality or date (Agaloos and Nepomuceno 1977);
Calico-an without locality, April and August 1945 (Potter 1953, two females in UMMZ);
Catanduanes **Dugui-too** behind Virac, May 1968, seven (Gonzales 1983; see also Manuel 1937);
Cebu within c.20 km of **Cebu City**, three collected, March–April 1877 (Tweeddale 1877a); **Danao**, July–November 1906 (McGregor 1907c); **Toledo**, July–November 1906 (McGregor 1907c), with sight records in the late 1940s or early 1950s (Rabor 1959);
Culion **San Pedro**, March 1947 (two specimens in FMNH, PNM; see also Dickinson *et al.* 1991, Lambert 1994b);
Dalahican July 1995 (M. Boussekey *in litt.* 1997);
Dinagat apparently fairly widespread in 1972, with evidence of breeding on **Mt Kambinlio** (duPont and Rabor 1973b), May 1970 (specimen in UPLB), March 1972 (male in AMNH) and May 1975 (male in USNM); **Balitbiton**, Loreto, April 1972 (female in DMNH);
Dumaran **Lagan**, where a daily roost site for up to 50 birds was reported (but see Remarks 1), with six in August or September 1991 (Lambert 1994b), 23 in October or November 1992 (Boussekey 1993, Lambert 1994b); **Bacao**, August 1995 (M. Boussekey *in litt.* 1997); **Bivouac** island inshore of west Dumaran, recently (Tabaranza 1992);
Gigantes without locality, July 1921 (specimen in ZMA), specifically **South Gigante**, July 1921 (female in MCZ);
Guimaras without locality, March 1982 (female in BMNH), and undated (de Elera 1895, Worcester and Bourns 1898);
Jolo **Jolo**, April 1887 (female in RMNH) and September 1891 (two specimens in USNM); "Hacienda of Opau" and "Hacienda of Panglima Hassau", November 1903 (three specimens in USNM); **Bual**, November 1904 (male in USNM); **Taglibi**, November 1903 (male in USNM); **Siit Lake**, November 1903 (female in USNM);
Lapac without locality, December 1883 (Guillemard 1885a; five specimens in AMNH);
Leyte **San Pablo airstrip** (bird being killed by an Eastern Marsh Harrier *Circus spilonotus*), March 1946 (Lint and Stott 1948); **Balinsasayao** at Abuyog, July 1961 (Parkes 1973, specimen in PNM); **Amparo**, July 1877 (Tweeddale 1878d; two specimens in BMNH are dated March 1877);
Loran undated (Dickinson *et al.* 1991);
Lubang without locality or date (McGregor 1904a);
Luzon Bataan, undated (de Elera 1895); **Abucay**, Bulacan, undated (specimen in YIO); **Calamba**, undated (de Elera 1895); Batangas, undated (de Elera 1895); **Manila**, but thought to be an escape, undated (Gibbs 1984); **Calauan**, Laguna, before 1842 (specimen in BMNH; see Remarks 2); **Dolores** (presumed to be the city or adjacent area south of Laguna), July 1880 (female in USNM); **Tayabas**, December 1903 (specimen in AMNH); **Manito**, Albay, August 1894 (male in BMNH); Mt Bulusan, by local report, October 1995 (R. Altamirano and A. C. Diesmos verbally 1995); "Camarines" province, 1902 (11 specimens in AMNH, ANSP); **Mt Isarog**, 1,100 m, several in March 1988 (Goodman and Gonzales 1990);
Malinsono July 1995 (M. Boussekey *in litt.* 1997);
Manuk Manka without locality, January 1906 (male in USNM; Dickinson *et al.* 1991);
Marinduque without locality, April–June 1888 (McGregor 1909–1910, duPont 1972b; male in AMNH);

Masbate **Dumurug Point**, April 1908 (Mearns 1909b); **Banco**, Palanas, until at least 1992 (Tabaranza 1992); reported by locals as visiting cornfields in the summer months at Matipuron at the 7-R Ranch, Milagros (Curio 1993);

Mindanao (*eastern*) "**Nipah**" island, apparently near Surigao City, July 1877 (Tweeddale 1878a, de Elera 1895); Sayaron, Madrid, reported to be present until 1986 (Tabaranza 1992); San Miguel, Madrid, reported by locals (Tabaranza 1992); **Placer**, July 1877 (Tweeddale 1877b, also specimen in MCML); **Sibahay**, Lanuza, below 1,000 m, May 1963 (male in USNM); **Agay**, Cabadbaran, Agusan, January 1952 (four specimens in ZMC); **Butuan river** (presumably the mouth of the Agusan River near Butuan), May 1877 (Tweeddale 1877b); with local reports from the municipalities of Cabadbaran, Tubay, Santiago, Jabonga and Kitcharao, all Agusan del Norte province, until the 1970s, but with only Tubay possibly retaining birds in 1992 (Tabaranza 1992); **Mt Mayo** at Limot, Mati, July 1965 (male in USNM); **Mati**, 60 m, December 1946 (specimen in FMNH); **Agustin Peninsula**, 1927–1928 (Hachisuka 1941); (*central*) **Lake Lanao**, May 1907 (male in ANSP); **Kidapawan**, February 1929 (male in DMNH); **Mt Apo** at Sibulan, early 1882 (Kutter 1883); **Daliaon**, January–March 1903 (three specimens in AMNH), February 1905 (Hartert 1906, Ogilvie Grant 1906); **Santa Cruz**, March 1877 (four specimens in BMNH), undated (male in MCML); **Davao** (Hartert 1906); **Malalag**, Davao, November 1946 (two specimens in CMNH, FMNH); **Madaum**, Davao, November 1946 (female in FMNH); **Maguindanao**, Cotabato, November 1910 (male in UMMZ); **Parang**, Cotabato, 30 m, January 1947 (male in FMNH); (*western*) **Tambulig** at Cabgan, October 1980 (male in DMNH); **Bucong**, Pagadian, June 1948 (female in ZMH); **Sibuguey Bay**, Siay, Zamboanga del Sur, where eight were seen in March 1992 and two flocks of 40–50 birds reported a few days earlier (Tabaranza 1992; see Remarks 1); **Zamboanga**, March–May 1878 (Tweeddale 1878h); **Ayala**, October before 1896 (three specimens in BMNH, CM);

Mindoro **Puerto Galera**, July 1921 (two specimens in MCZ); foot of **Mt Dulangan**, January 1896 (male in AMNH); **Balete**, around April 1905 (McGregor 1905c); **Bayog** and adjacent **Calawang**, Naujan, May 1937 (Peters 1939; specimens in MCZ); **Pola**, October 1903 (male in ANSP); **Subaan**, December 1906 (male in USNM); with local reports from Malpalon, October 1991 (Dutson *et al.* 1992), Siburan, Sablayan Penal Colony, in 1991 (Brooks *et al.* 1995b, Evans *et al.* 1993a), Mt Ilong, 1991 (Evans *et al.* 1993a), Mt Baco, 1994 (L. Co verbally 1995) and San Vicente, 1991 (Evans *et al.* 1993a);

Negros **Bacolod**, Negros Occidental, July 1921 (male in MCZ); **Mt Canlaon** "in the lower forests", March 1896 (Ogilvie Grant 1896c; female in BMNH); **Mt Talinis** at Valencia, August 1877 (Tweeddale 1878c); **Pagyabunan**, Bais, 300 m, May 1949 (four specimens in FMNH); **Amio** at Binantangan, May 1948 (male in FMNH); **Lake Balinsasayao**, 625 m, 1994 (L. Tag-at verbally 1995);

Palawan (see Remarks 3) **Gulang-gulang**, April 1932 (Dupond 1942); **Pagdanan** at the PTPI concession, October 1978 (Fisher mss), August 1984 (Quinnell undated); **Port Barton**, pair nesting, February 1987 (M. Boussekey *in litt.* 1997); **Roxas**, recently (P. Adriano verbally 1995); **Malabusog**, Tinitian, Roxas, April 1962 (female in UPD); near **Babuyan river**, March 1994, where 13 seen (P. Adriano and M. Boussekey *in litt*. 1997); **Sabang**, March 1990 (Greensmith 1990) and March 1994 (Davidson ms); **Canabong** and **Tumamporo**, April 1997 (M. Boussekey *in litt*. 1997); **St Paul's Subterranean River National Park**, currently (Sargeant 1989, Jensen and Hornskov 1992, Lambert 1994b, P. A. J. Morris *in litt.* 1996, W. Simpson *in litt.* 1997); **Bahile**, March 1987 (M. Boussekey *in litt.* 1997); Rita Island in Ulugan Bay, undated local report (Tabaranza 1992); **Buenavista**, July 1997 (M. Boussekey *in litt.* 1997); **Iwahig Penal Colony** near Balsahan, May 1983, 20 (Clarke 1983); **Tagnipa**, Cabayugan, Puerto Princesa, up to 25 recently (P. Adriano verbally 1995; also Boussekey 1996a,b); vicinity of **Puerto Princesa**, September 1887 (two specimens in FMNH; Sharpe 1888), 1905 or 1906 (McGregor 1906d), 1907 (Lowe 1916), March 1916 (Zimmer 1918b), September 1925 (Baud 1978), March 1942 (specimen in PNM), April 1947 near sea-level (female in FMNH); **Sagpangan**, Aborlan, June

1950 (specimen in PNM); **Kabigaan**, Aborlan, May 1962 (specimen in PNM); **Mt Katabutabuan**, Aborlan, May 1962 (male in PNM); **Tagbariri**, April 1916 (Zimmer 1918b); **Mt Victoria**, Mariwara, Aborlan, February 1967 (two specimens in PNM); **Narra**, 95 km south of Puerto Princesa, August 1977 (Won 1986b); **Panacan**, July 1997 (M. Boussekey *in litt.* 1997); **Babulongan**, Quezon, May 1963 (specimen in PNM); **Calatugas**, April 1916 (Zimmer 1918b); **Campong**, Rizal, recently (P. Adriano verbally 1995); **Candauaga**, March 1916 (Zimmer 1918b); **Taguso**, July 1887 (Whitehead 1890, female in AMNH); **Brooke's Point**, March 1916 (Zimmer 1918b) and at Macagua, below 75 m, April 1962 (female in USNM); **Bonobono**, March 1916 (Zimmer 1918b); **Sarong**, March 1916 (Zimmer 1918b); with local reports of uncertain provenance (see Remarks 1) from Tagbas, Ilog (Iloy) River, Rizal, Remog, Pangalingan on the Balintary River, Sicud and Danlig (Lambert 1994b);

Panaon without locality, October 1877 (Tweeddale 1878e);

Panay without locality or date (Bourns and Worcester 1894); no recent records (Brooks *et al.* 1992), although there are unconfirmed local reports of "white parrots" from Antique province (Y. de Soye verbally 1997).

Pandanan **Manas**, July/August 1995 (M. Boussekey *in litt.* 1997; also Lambert 1994b);

Patnanungan off Polillo at **Tapul**, May 1996 (Gonzalez and Dans 1996, Gonzalez 1997);

Polillo (see Remarks 4) **Anibawan**, March and April 1956 (Manuel 1956, female in PNM); **Agta-Sabang**, May 1996 (Gonzalez 1997, J. C. T. Gonzalez verbally 1997); **Jomalig Island**, May 1996 (Gonzalez 1997, J. C. T. Gonzalez verbally 1997); by local report at Sibulan and Santa Maria, May 1996 (J. C. T. Gonzalez *in litt.* 1997);

Rasa without locality, March 1967 (specimen in PNM), March 1971 (specimen in DMNH); population still present in 1997 (M. Boussekey *in litt.* 1997);

Samar **Catubig river** in the north of the island, October 1906 (female in USNM); **Mt Capoto-an**, May 1957 (female in AMNH); **Matuguinao**, December 1951 (two specimens in PNM), and at 100–400 m, and at San Isidro, Matuguinao, April 1957, five being collected (Rand and Rabor 1960); **Oras**, June 1948 (two females, one specifying San Policarpio, in PNM); **Buluan**, Calbiga, March 1969 (two specimens in PNM); **Tagaslian**, Borongan, June 1948 (two specimens in PNM); **Silago river**, April 1908 (Mearns 1909b); **Sohoton**, 1994 (C. Makabenta verbally 1995); **Salcedo** at "CSAC", March 1970 (male in PNM);

Sanga-sanga without locality, July 1958 (female in DMNH), October–December 1971 (duPont and Rabor 1973a; male in UPLB);

Sarangani without locality or date (Dickinson *et al.* 1991);

Siargao apparently fairly widespread in 1972 (duPont and Rabor 1973b); **Mahayahay**, a pair in April 1992 (Tabaranza 1992); **Osmeña**, Dapa, April–May 1972 (four specimens in DMNH);

Siasi without locality, April 1880 (specimen in ZMB), November 1884 (female in MNHN), February 1908 (Mearns 1909b);

Simunul 5 km south-west of Tubig Indangan, by local report until 1995 at least (Dutson *et al.* 1996);

Siquijor **Capalasanan**, Lazi, May 1953 (male in FMNH, female in ZMH); **Lilo-an**, Maria, January 1954 (six specimens in FMNH) down to 1991 at least, the last remaining pair on the island (Evans *et al.* 1993b);

Tablas without locality or date (Bourns and Worcester 1894);

Tawitawi near **Tataan**, September 1991 (Lambert 1994b); **Mt Binuang**, August 1995, pair in the vicinity of several remaining suitable nest trees (D. Allen *in litt.* 1995); **Bud Sicali** (Bud Sirhuahua), August 1995 (D. Allen *in litt.* 1996); **Batu-batu** ("and elsewhere" where there were "still good patches of original vegetation"), December 1971 (duPont and Rabor 1973a), with two pairs still present in August 1994 (G. C. L. Dutson *in litt.* 1996); reported (as rare) by local people from Tandubatu, Baliungan and Dundangan, January 1995 (Diesmos and Pedregosa 1995);

Ticao without locality, April 1902 (McGregor 1903; two birds in FMNH);
Tumindao without locality or date (Dickinson *et al.* 1991).

Untraced localities are Dalik on Balabac, 1994 (Adriano and Palatino 1995); Magallanes, Davao, Mindanao, 60 m, January 1947 (eight specimens in FMNH); "Mucas, Mindanao", February 1904 (two females in USNM), "Fukalael, Mindanao", January 1930 (female in DMNH); San Bernardino on Negros, 1875 (Sharpe 1877); Dandelit on Palawan, March 1916 (Zimmer 1918b). There is an unconfirmed report from Sibutu island, May 1996 (D. Allen *in litt.* 1996).

POPULATION As recently as 50 years ago the Philippine Cockatoo was common throughout the Philippines (Delacour and Mayr 1946), even being considered a pest in many areas owing to its depredation of rice and corn (e.g. Forshaw 1989). Its subsequent population decline, particularly since 1980, has been dramatic, leading to the (perhaps only slightly) exaggerated claim that it has become "the most endangered bird species in the Philippines" (Dickinson *et al.* 1991), with extinction predicted within ten years in the absence of measures to counter trapping (Gonzales and Rees 1988). It is "now rare ... and confined to a very few islands" (Dickinson *et al.* 1991). The total population of the species was estimated to be 1,000–4,000 in the early 1990s (Tabaranza 1992, Lambert 1994b). Of these, 750–2,800 birds were estimated to remain in Palawan province (Lambert 1994b), "several hundred" (Lambert 1994b) or 100–200 (Tabaranza 1992) on Tawitawi in the Sulus, 180–450 on Mindanao (Tabaranza 1992) and 50–70 on Masbate (Tabaranza 1992). Populations away from Palawan and the Sulus probably total fewer than 500 birds and thus have little chance of long-term survival, given increasing fragmentation of already isolated forest patches and the fact that all subpopulations comprise a few individuals in scattered localities (Lambert 1994b).

Palawan and its satellites On Palawan the species was considered "plentiful" by J. B. Steere in 1874 (Sharpe 1877), common in the 1880s (Whitehead 1890), "one of the commonest birds" by Lowe (1916), one of whose specimen labels (in BMNH) is inscribed "abundant and roosts in large flocks", and abundant by Zimmer (1918b). It was still fairly common ("common along coasts and in forests") in the early 1960s (McClure 1974) and 1970s (duPont and Rabor 1973b). However, as throughout the remainder of its range, the species has declined dramatically since 1980, and Lambert (1994b) presented much anecdotal evidence indicating a population drop of 60–90% over a wide area of the island.

Present strongholds in Palawan province, which may still contain viable populations, are few. In St Paul's Subterranean River National Park and surroundings the population (100–200 birds) is concentrated in, or potentially confined to, the mainly unprotected Babuyan Valley (where the minimum breeding density was estimated to be 0.5–1 nest per km^2, with a predicted 75–90 nest sites along 25–30 km of the Babuyan River, suggesting that, in optimal conditions, the valley could support several hundred pairs); additional small populations occur in valleys south of Cleopatra's Needle (Lambert 1994b). In the lowland plains of southern Palawan, between Roxas and Taytay, the density of nesting cockatoos is thought to be very low, probably only one pair per 1–5 km^2 (Lambert 1994b). On the west coast of the island south of the latitude of Puerto Princesa, c.200 birds may occur, although there have been "no recent reports from the deforested east coast south of Puerto Princesa", where it was common until 1980 (Lambert 1994b). On the small (20 km^2) island of Rasa off the east coast of Palawan at least 50 birds were still present in 1997 with some 10 active nests (M. Boussekey *in litt.* 1997).

Dumaran Island probably holds 150–250 cockatoos (Lambert 1994b), although most birds probably breed on the mainland, since villagers who reported the species to breed in the interior of the island could only locate one nest site, and little suitable habitat was thought to remain. The population at Lagan village had been estimated (by a local villager) at 500 in 1974, but only c.50 were thought to remain (and just six were seen during brief surveys) in 1991 (Lambert 1994b). In 1991 Bugsuk and Pandanan Islands retained extensive forest cover

and probably supported 100–200 (perhaps 300) birds, but were being visited by trappers from the mainland (Lambert 1994b). Bancalan is also likely to hold birds, but the lack of surveys in 1991 prevented any estimate (Lambert 1994b).

Balabac is known to harbour the species (e.g. Adriano and Palatino 1995) although forest cover is small and the cockatoo population probably likewise (Lambert 1994b). Culion and Busuanga are reported to support populations (Lambert 1994b), but only the latter supports a moderate amount of forest (see Threats under Palawan Hornbill *Anthracoceros marchei*). Other, smaller offshore islands, such as those east of Taytay (e.g. Calabadian, Icadambananan and Binatican) may hold birds; surveys are required to determine this (Lambert 1994b). Lambert (1994b) also considered that cockatoos are likely to occur in the Pagdanan range and adjacent lowlands in western Palawan, and around the mangrove-rich area of Malampaya Sound.

For the stronghold of Palawan and satellite islands, the minimum population size (of 750) assumes that populations persist between Roxas and Taytay and on the islands north of Dumaran. The maximum estimate (of 2,800) assumes a mean population density in Palawan of one bird per km^2 of suitable habitat, based on density estimates in suitable habitat in St Paul's Subterranean River National Park and in southern Palawan (Lambert 1994b). Maps digitised by the World Conservation Monitoring Centre, based on satellite images of 1979–1983, indicate that Palawan retained 3,847 km^2 of lowland forest at that time (see Lambert 1994b). However, given the species's habitat preferences during surveys in 1991, the real area of suitable habitat was probably then nearer 2,500–3,000 km^2 (Lambert 1994b), and it is on the basis of these figures that Lambert (1994b) made his population estimates. Subsequent deforestation obviously means a decline from these figures (J. C. T. Gonzalez verbally 1997).

Sulu Archipelago The Sulus were considered a stronghold around 1980 (Forshaw 1989), cockatoos having been "exceedingly common" in 1883 (Guillemard 1885a) and still fairly common on Sanga-sanga, Simunul and Tawitawi 80 years later (duPont and Rabor 1973a). By 1991 only Tawitawi was thought to retain sufficient lowland forest (then perhaps 250–350 km^2) to support viable populations (Lambert 1994b), and—despite a substantial decline since 1980 (Lambert 1994b)—current estimates range from around 100–200 (Tabaranza 1992) to "several hundred" (Lambert 1994b). This be may an optimistic estimate: the 1991 estimate of intact forest is now judged to have been mistaken (see Threats), and villagers consider the species to have been widespread but now much reduced due to trapping, birds being caught by the application of a resinous liquid (*Artocarpus* gum) to fruiting trees (D. Allen verbally 1997).

Mindanao On and around Mindanao, the species was formerly widespread with flocks of 30–40 seen at Sibulan, at the foot of Mt Apo, in early 1882 (Kutter 1883). Now, however, it appears close to local extinction, with: 100–300 around Madrid and San Miguel, Surigao del Sur; and 30–50 at Siay, Sibuguey Bay, Zamboanga del Sur (Tabaranza 1992). Surveys elsewhere on Mindanao neither recorded the species nor received local reports of its continued occurrence (Tabaranza 1992, Lambert 1994b).

Bohol There have only been occasional records on Bohol since 1988 (Lambert 1994b, Brooks *et al.* 1995c), and in early 1997 it was judged that "probably not more than a few pairs remain" on the island (F. Verbelen *in litt.* 1997).

Siargao and Dinagat Tabaranza (1992) estimated 50–100 birds on Siargao and Dinagat islands (although only two were seen during a survey in 1991), where the species had been considered "quite ... common" in 1972 (duPont and Rabor 1973b).

Siquijor The species was already scarce in the 1950s (Rand and Rabor 1960); 30–40 were reported to visit ripening crops in 1989 (J. Hornskov *in litt.* 1989). In August 1991, however, just a single pair was found to remain, which had been robbed of its nestlings for the previous five years (Evans *et al.* 1993b).

Western Visayas There are no recent records or local reports from Negros (despite 36 days fieldwork in 1991), and only a single recent report from Panay (Brooks *et al.* 1992, Evans *et al.* 1993a, Y. de Soye verbally 1997). Cockatoos were not recorded on Mindoro

during 38 days of fieldwork in 1991, although there remain scattered reports of single birds and pairs (Evans *et al.* 1993a). It is apparently extinct on Cebu (Evans *et al.* 1993a, Brooks *et al.* 1995a), having been abundant there in 1877 (Tweeddale 1877a).

Masbate and Polillo Tabaranza (1992) estimated 50–70 on Masbate. The Polillo Islands still harbour a tiny population on Patnanungan, but the main island of Polillo, where one roost numbered several hundred (McGregor 1910a), appears to have lost its last breeding pair (Gonzalez and Dans 1996, J. C. T. Gonzalez *in litt.* 1997).

Luzon On Luzon, there have only been two recent records (Gibbs 1984, Goodman and Gonzales 1990), possibly representing escaped cagebirds, and surveys elsewhere (including in the Sierra Madre) have failed to locate the species (Tabaranza 1992).

ECOLOGY ***Habitat*** Surveys on Palawan in 1991 indicated that this cockatoo has a specific habitat requirement of forest or forest patches (including second growth) in lowlands, adjacent to or in riverine or coastal areas with mangrove vegetation (Lambert 1994b). Stands of tall trees suitable for breeding extend to 300–400 m in riverine valleys of steep-sided mountains, but such mountains, even if forested and separated by denuded lowlands, appear to be shunned (Lambert 1994b). The species uses non-forest habitats outside the breeding season, foraying into corn- and ricefields for ripening grain (Rand and Rabor 1960, Dickinson *et al.* 1991, Curio 1993). Such habitat preferences appear to be relatively consistent throughout the species's remaining range, and tend to indicate that lowland dipterocarp forest is not and was not significant. The cockatoo's absence from the largely forested Sierra Madre mountains along the eastern coast of northern Luzon suggests that, at this latitude, some factor is unfavourable for the species (Lambert 1994b).

Mangroves appear to be critically important for many aspects of the species's biology, although it is conjectured (without explanation) that this may not always have been the case (Lambert 1994b). Supporting evidence for the relationship is great: Palawan—the stronghold of the species—held 38% of the Philippines' remaining mangroves in 1985 (Quinnell and Balmford 1988), and many current localities occur near coastal mangroves; Palawan villagers report cockatoos to be commoner in mangrove areas (although see Remarks 1); the small islands originally inhabited are likely to have supported mangrove forest; the lack of records from northern Luzon may be explained by its coastal topography, which lacks the numerous inlets and small inshore islands where mangroves typically proliferate; birds roost in mangroves at several sites, feed on the fruits of *Sonneratia* and breed in the taller trees of mangrove forests at Siay, Zamboanga del Sur, Mindanao (Tabaranza 1992, Lambert 1994b). The cockatoo's apparent preference for lowlands may, in part, reflect the bias in early collecting localities to these more accessible sites (Lambert 1994b); however, the direct importance of mangroves confirms the species's status as a lowland bird, and records from mountainous regions, including the particularly high one (1,100 m) from Mt Isarog on Luzon (Goodman and Gonzales 1990), must be considered unusual (and may relate to escaped birds).

On Palawan (and presumably elsewhere) many pairs appear to roost close to, or even in, their nest sites (Lambert 1994b). Others congregate to roost in tall coconut trees or mangroves *Sonneratia* on deserted beaches (e.g. on Mindanao and Palawan) or small islands up to 20 km offshore (e.g. Pandanan, Bivouac and Dumaran) or, occasionally, in single large dead trees (McGregor 1910a, Gonzales 1983, Tabaranza 1992, Boussekey 1993, Lambert 1994b, M. Boussekey *in litt.* 1997). Island-roosting birds fly from the mainland, and may represent non-breeding individuals. Whether mature adults roost at their nest sites all year, or change roosting behaviour seasonally, is not known. Roost sites are not used every night, and it is likely that the use of a roost site depends on proximity to the day's feeding area, and on the level and continuity of disturbance.

Food There have been no detailed or quantitative studies of the diet of this species. Records of non-cultivated foods include the use of "low fruiting trees that grew in otherwise cleared

and cultivated areas" on the Sulus in 1971 (duPont and Rabor 1973a); flowers of "dapdap" tree *Erythrina orientalis*, fruits of narra *Pterocarpus indicus* and seeds of "taluto" *Pterocymbium tinctorum* (M. Boussekey *in litt.* 1997); the fruits of four unidentified plant species (although the most consumed was a legume) in riverine secondary growth on Palawan (Lambert 1994b); seeds of wild bananas (Rabor 1977a); "white rectangular seeds 3/4 of an inch long", found in the crop of a female taken in April at Calico-an (Potter 1953); (by report) fruit of the mangrove *Sonneratia* (Lambert 1994b). Otherwise, ripe guava, bananas, young corn and "palay" are among the favoured foods (Gonzales 1983). Birds frequently visit maize fields, usually just prior to crop ripening (Hachisuka 1931–1935, duPont and Rabor 1973b, Rabor 1977a, Gonzales and Rees 1988), which is in March on Mindanao (Tabaranza 1992). Lowe (1916) reported great damage done by large flocks to maize on Palawan. In August and September on the same island, cockatoos visit ricefields just prior to harvest; they are said to favour upland rice, but in times of former abundance even visited wet paddies (Whitehead 1890, Lambert 1994b).

Breeding Breeding generally occurs in the span March–June, although an active nest was found near Port Barton, Palawan, in February 1987 (M. Boussekey *in litt.* 1997), a pair were reported incubating eggs in St Paul's Subterranean River National Park in February 1994 (Robson 1994), and an occupied nest hole was reported near Tagbas, Palawan, in August 1991 (Lambert 1994b). On Palawan birds generally mostly breed in the period April–June (Gonzales 1983). Breeding-condition birds were collected on Cebu in March and April (Tweeddale 1877a), nestlings were taken on Masbate in May (Hachisuka 1934) and on Ticao in about April/May (McGregor 1909–1910, Dickinson *et al.* 1991), with young heard in a nest on Calico-an, late June (Potter 1953). Other breeding records include Dinagat in early April 1972 (duPont and Rabor 1973b), Palawan on "4 May" (actually a slip for 4 April) (Zimmer 1918b), Mindoro around April (McGregor 1905c) and Negros in April and May, including two females collected with enlarged eggs in their ovaries (Rabor 1977a).

Nests are generally in holes high (often 30 m) in very tall emergent trees, frequently dead and in clearings (duPont and Rabor 1973b, Lambert 1994b, Boussekey 1996a). At Balete on Mindoro "at least one pair... had a nest in the hollow limb of an immense tree" (McGregor 1905c). All seven nest trees observed by Lambert (1994b) on Palawan were below 150 m altitude, and three were adjacent to major rivers; all were at 20–30 m in trees c.35–40 m tall, in either the main trunk or a major branch. Trappers on Palawan report that holes are generally 30 m above the ground (M. Boussekey *in litt*. 1997), but one nest on Calico-an was just 6 m high (Potter 1953). Nest holes may be made by woodpeckers, probably Great Slaty *Mulleripicus pulverulentus* and White-bellied *Dryocopus javensis* (F. R. Lambert verbally 1997). "Manggis" *Koompassia excelsa* (Leguminosae) are used in southern Quezon, Palawan (Lambert 1994b). Around St Paul's Subterranean River National Park, common nest trees are "apitong" *Dipterocarpus grandiflorus* (Dipterocarpaceae) and "ipil" *Intsia bijuga* (Leguminosae) (Lambert 1994b, M. Boussekey *in litt.* 1997); elsewhere on the island (and on offshore Rasa) "malugai" *Pometia pinnata*, "bogo" *Garuga floribunda* and "atpai" *Vatica mangachapoi* have been recorded as nest trees (M. Boussekey *in litt.* 1997). Lambert (1994b) received an unreliable report of a bird nesting in an "almaciga" *Agathis dammara* in a karst limestone area. "Tuog" trees are used on Mindanao (Tabaranza 1992).

Clutch-size is reported to be two or three, but occasionally one, throughout Palawan (Lambert 1994b). It is unclear whether pairs breed every year; although nest holes are occupied annually, this is possibly by different pairs, owing to a paucity of suitable nest trees and parental care conceivably exceeding one year (Lambert 1994b).

Migration Although not a regular migrant, various items of evidence suggest that the species is wide-ranging and partially nomadic; such behaviour is typical of frugivores relying on seasonally fluctuating food resources. Birds fly from the mainland to offshore islands to roost, and some may breed there (Lambert 1994b).

THREATS Habitat destruction and intensive trapping for the cagebird trade are the main threats (Boussekey 1993, Lambert 1994b), although the relative severity of these factors varies between islands; but throughout the current range the one greatly amplifies the effects of the other. While the worst influence of these factors is in the areas where modest populations still survive, the effect of trapping on remnant populations, which represent the best hope of rebuilding stocks, is or will be to cause island extinctions: thus for example it has been warned that the persistent removal of nestlings from the sole remaining pair on Siquijor—unless ceased immediately—will undoubtedly cause the local extinction of the species (Evans *et al.* 1993b).

Trade In Palawan in particular, trapping is the most serious threat, with chicks being taken from virtually every known accessible nest (Boussekey 1993, Lambert 1994b). The high value of the species (in 1991 trappers could be paid US$16–32 per bird, up to 10 times that of other hole-nesting birds such as Blue-naped Parrot *Tanygnathus lucionensis* and Hill Myna *Gracula religiosa*) stimulates avid seeking and monitoring of nests (Lambert 1994b). Trappers on Polillo in 1996 were selling cockatoos to dealers in Manila for US$25 (J. C. T. Gonzalez *in litt.* 1997). In 1997 a single bird in a Manila market was being sold for US$170, whereas back in 1975 birds of this species could be obtained inside the country for less than US$1 (M. Boussekey *in litt.* 1997). As numbers of breeding pairs (and thus nestlings) decrease (and perhaps as prices rise), adults are also increasingly trapped (Tabaranza 1992).

In the Tagbas region at least, Palawan tribesmen purposely leave *Koompassia excelsa* nest-trees in otherwise cleared land, a practice which appears confined to southern Palawan (Lambert 1994b). The removal of nestlings is particularly serious given the low population size, since the demographic structure will become skewed increasingly towards older birds; it is anticipated that the species will disappear from many areas as these older birds die (Lambert 1994b). Palawan tribesman reportedly visit offshore islands to the south (e.g. Pandanan) to capture birds during the breeding season (Lambert 1994b). Elsewhere in Palawan, professional (Filipino) trappers travel widely to catch cockatoos (Lambert 1994b). Trappers reportedly identify coconut trees used as roost-sites by the fact that individual fronds of the leaves are bitten off at the base (Lambert 1994b).

Nestlings collected have a mortality rate of 50% (Boussekey 1996b), suggesting that the number in trade may represent half, or fewer, of those actually taken. In the 1980s up to ten were trapped per day on Dinagat Island (Tabaranza 1992). At Cartimar market, Pasay City, Metro Manila, Boussekey (1993) saw 50 birds in 1985 and four in November 1992, and Lambert (1994b) reported 18 on 10 August 1991. Most traders said that these birds came from Palawan on military planes, with single individuals reported to originate from Samar and Mindanao (Lambert 1994b). However, boats carrying nickel ore from Rio Tuba direct to Japan also reportedly carry cockatoos, and the passenger boat service from Palawan to Manila regularly carries tens of birds (and sometimes hundreds in the breeding season): thus in a three-month breeding season, a minimum of 150 cockatoos probably leave Palawan by this route alone each year (Lambert 1994b).

Trade has not been closely monitored, with regard to origin, destination and numbers (Tabaranza 1992). Most cockatoos appear to be exported to Manila or beyond, although the species was unknown in captivity outside the Philippines until the 1960s (Low 1996). The numbers in international trade were believed to range from 424 in 1983 to 14 in 1989, with a minimum of 19 destination countries (Tabaranza 1992). The main importer was the USA, except in 1988, when the Federal Republic of Germany acquired 52% of all imported cockatoos (Tabaranza 1992).

Habitat loss Deforestation throughout the Philippines has been a major cause of the cockatoo's population crash. On Mindanao deforestation (particularly of mangrove areas such as Sibuguey Bay), combined with trapping, has caused a serious decline (Tabaranza 1992). The Sulu Archipelago is now largely deforested, cultivated and heavily populated; observers in around 1987 and September 1991 considered that "extensive forest still exists"

on Tawitawi (Krupa and Buck 1988, Lambert 1993c), but such forest (as seen from the air) appears actually to be young secondary growth (almost all trees are currently below 20 cm in diameter at breast height), and logging of the few remaining areas with large trees—almost entirely confined to rugged and mountainous areas—appears to be unsustainable and soon to be followed by uncontrolled settlement and full conversion to agriculture as the island develops and malaria is eradicated (D. Allen *in litt*. 1996, 1997).

Although commercial logging on Palawan was recently suspended by presidential decree, nearly all of the island's forests have been leased to logging operations (Lambert 1994b). Commercial logging at Pagdanan (adjacent to Port Barton) which, as elsewhere, ought to be on a minimum 45-year rotation, was predicted to be complete by 1999 (Quinnell and Balmford 1986). Moreover, illegal activities persist (Lambert 1994b). The main target trees are of the same size-category and species (e.g. *Dipterocarpus grandiflorus* and *Intsia bijuga*) as those in which the cockatoos breed (Lambert 1994b). Forest clearance for *kaingin* has had a devastating impact, with 13% of the forest disappearing thus between 1979 and 1984, although this pressure may have lessened substantially in the past few years (M. Boussekey *in litt*. 1997). Increasing human numbers (whereby the population of Puerto Princesa has trebled in 15 years: Low 1996) will undoubtedly increase the rate of forest clearance. A report that the islands of Busuanga, Culion and Balabac are now largely deforested (see Kemp 1995) is not entirely accurate: while Culion is severely and probably irreparably damaged, with a constant influx of settlers (Orig 1997), Busuanga has suffered fairly badly but may retain 40% forest cover (NADM), and Balabac retains only a small amount of forest (see Population above). Local people on Pandanan reported that that island and Bugsuk were still heavily forested, although recent vegetation maps based on 1987–1988 satellite imagery suggested otherwise (Lambert 1994b).

If the species is even partly dependent on large woodpeckers to excavate nest-holes (see Breeding), then there is an inherent dependence on the ecological conditions in which these woodpeckers thrive.

Given the apparent link between cockatoos and mangroves, the rapid clearance of this habitat is of particular concern. Palawan's mangroves, which covered 46,000 ha in 1988, are being cleared rapidly for fuelwood (in the absence of commercial firewood plantations) and for fishpond construction (Quinnell and Balmford 1988). Total mangrove loss in the early 1980s was estimated at 350 ha per year (Pido 1988), a rate that has probably increased since.

Persecution Cockatoos are also persecuted for their depredation of maize and rice crops (Hachisuka 1931–1935). This was particularly acute on Tawitawi, but now appears less so. The recent switch from the cultivation of maize to "agar-agar" (seaweed) is a mixed blessing: cockatoos are no longer persecuted (as there is no maize for them to depredate), but they are forced to find alternative food sources (D. Allen verbally 1997). Birds are also hunted for food (Lambert 1994b). On the Sulus in 1883 cockatoo flesh was considered "good eating, and free from the bitterness so characteristic of many of the Parrots" (Guillemard 1885a).

Disease risk Viscertropic Velogenic Newcastle Disease or Psittacine Beak and Feather Syndrome may have been introduced into the wild population by the release of captive birds, possibly even into the core area of St Paul's Subterranean River National Park (Lambert 1994b). Aspergilla spores have been found in the litter below nest holes, suggesting an additional disease threat (Tabaranza 1992).

MEASURES TAKEN The species was included in CITES Appendix I, banning all international trade, in March 1992. Prior to this revised listing, DENR Administration Order No. 90 had set an annual quota of 25 birds, to be reduced by 10% per year starting in 1990 (BRT).

Since 1983, Palawan has been a "game reserve" (Presidential Proclamation 219), in which (for what it is worth) it is illegal to catch any wild animals, and it is also a Fauna and Flora Watershed Reserve (Presidential Proclamation 221); DENR is responsible for implementing

this law (BRT). The Haribon Foundation has been gathering information on trade in Palawan and Manila (Lambert 1994b), but apparently only one cockatoo was located in trade during 1993 (DENR 1993).

Awareness campaigns, considered by Lambert (1994b) to be the most urgent requirement of any conservation strategy for the cockatoo, are being conducted on Palawan (*Sagip Katala* ["Save the Cockatoo"], with 40 representatives in five localities: see Boussekey 1996a,b), and on Mindanao (MSU-IIT and Haribon Foundation Ranao Chapter with support from the MacArthur Foundation), the latter campaign targeting schools and communities (Tabaranza 1992). The Palawan initiative, based on a decision by one small zoo (St-Martin-la-Plaine, France) to "adopt" a threatened species, has included a weekly radio transmission that induced listeners to report 300 birds at 10 different localities; conservation posters featuring the species in three major languages have been distributed nationwide (Boussekey 1993, 1996b). In the mid-1990s the species had already featured on an environmental awareness poster as part of the "Only in the Philippines" series, funded by British Airways Assisting Conservation and FFI, with text in English and Tagalog (W. L. R. Oliver verbally 1997).

An international breeding programme involving captive birds has been in place since 1992, following a Memorandum of Agreement signed by DENR and known breeding facilities: 20 pairs are held by Birds International, Inc., on Palawan, with 26 chicks hand-raised in 1995 (M. Boussekey *in litt*. 1997). A recovery programme by European breeding stations, led by the St Martin-la-Plaine Zoo in France, was initiated in February 1993 (Boussekey 1993), with 87 birds registered by 1995 (Low 1996). This is complemented by a nest-watch scheme which allowed 10 young to fledge on Palawan in 1997 (M. Boussekey *in litt.* 1997).

Records of the cockatoo derive from one NIPAP site (Mt Isarog on Luzon) and three CPPAP sites (Bataan Natural Park/Subic Bay on Luzon; Siargao Island; Mt Apo on Mindanao; see Appendix) although the Bataan and Mt Apo populations almost certainly disappeared many years ago. The species survives in three other protected areas (Rajah Sikatuna National Park on Bohol; Calauit Wildlife Sanctuary off north Palawan; St Paul's Subterranean River National Park on Palawan) while coastal Tawitawi and Mt Talinis/Twin Lakes on Negros (including Lake Balinsasayao and Eastern Cuernos de Negros "key sites") have been proposed for FPE funding (see Appendix).

MEASURES PROPOSED Apart from the areas targeted for conservation above, the species is known, at least historically, from 10 "key sites" (Central Catanduanes off Luzon; Lake Naujan on Mindoro; Mt Bandila-an on Siquijor; Mts Cabalantian/Capoto-an on Samar; Mt Mayo on Mindanao; Central Basilan; San Vicente/Taytay/Roxas ranges, Victoria/Anapalan ranges and Mt Mantalingahan on Palawan; Sibutu/Tumindao islands; see Appendix) and these should be designated for protection under the NIPAS process. Lambert (1994b) supported the proposed expansion of St Paul's Subterranean River National Park to include the entire Babuyan valley (in the area where the valley widens at the southern end of the Mt St Paul massif), an area of 32,500 ha which he considered to hold up to 200 cockatoos. This is the only population not seriously threatened by trapping, but continued forest clearance adjacent to the park, if not stopped, will cause a population decline. The conversion of mangroves should be regulated or ceased for the benefit of both cockatoos and the offshore fishing industry (Tabaranza 1992). Other lowland areas where populations are known or likely to persist should also be protected, e.g. several localities on Palawan including the offshore island of Rasa, which is largely unaffected by human pressures owing to the lack there of potable water and to whose conservation the local authorities are sympathetic (M. Boussekey *in litt.* 1997); the islands of Bugsuk, Pandanan and Culion; Sibuguey Bay in Zamboanga del Sur; Languyan Point, Tawitawi; and San Miguel, Tago, Surigao del Sur. There is a strong case for the establishment of a (terrestrial) reserve to protect remaining forest on Bugsuk since the main commercial interest of the owners lies offshore in the farming of oysters for pearl culture in

the straits towards Pandanan (Lambert 1994b). However, such a reserve (or reserves) would still require protection of nests from visiting trappers.

An education campaign is called for, managed by an internationally funded campaign officer, working in close conjunction with relevant governmental and non-governmental bodies, incorporating components of the very successful *Amazona* parrot conservation projects in the Caribbean (see Butler 1992), whereby local communities are encouraged to become active participants in conservation efforts (Lambert 1994b). This campaign—which is already taking shape through the dedicated intervention of M. Boussekey—could also be extended to cover other scarce hole-nesting species, such as Blue-naped Parrot *Tanygnathus lucionensis*, Sulu Hornbill *Anthracoceros montani* and Palawan Hornbill *A. marchei* (Lambert 1994b, D. Allen verbally 1997). Despite this, however, illegal trade may only be countered through the introduction of economically viable alternatives: locally based income-generating activities that lessen the threats to birds and their habitat should therefore be promoted (Lambert 1994b).

The difficulties of conveying and enforcing the new CITES legislation have certainly contributed to the species's decline. Drastic measures (perhaps necessary given the urgency of the situation) to combat illegal trade could include the establishment of DENR-manned posts at airports, major ferry terminals (e.g. Puerto Princesa) and the Rio Tuba nickel-ore port (Lambert 1994b).

Lambert (1994b) did not consider captive breeding an important option, although efforts to coordinate the breeding of already captive birds should continue. Very few of the many cockatoos exported to Europe and the USA since 1980 remain alive, most dying of stress-induced disease within their first year in captivity (Lambert 1994b). Captive breeding is difficult owing to the aggressive behaviour of males (Low 1996). Although an internationally coordinated breeding programme could complement *in situ* conservation initiatives, there is no guarantee that captive-bred birds would survive once released into the wild, and in any case such releases are probably not to be countenanced, given the risks of disease transmission.

To develop a management strategy for this species, further fieldwork is needed to elucidate its true status. Priority areas for such surveys, identified from a combination of an understanding of habitat requirements, satellite imagery and information from bird trappers (see Measures Proposed under Palawan Peacock-pheasant *Polyplectron emphanum*), include: Balabac, Busuanga and Culion islands, where populations are reported to persist (Lambert 1994b, Adriano and Palatino 1995), although see Remarks 1; the Pagdanan range and adjacent lowlands between Roxas and Taytay on western Palawan; and around Malampaya Sound; together with remaining forested areas on Mindanao (to complement the work of Tabaranza 1992), Mindoro, Catanduanes, Polillo and satellites (recently undertaken in these last islands: Gonzalez and Dans 1996), Samar and Leyte (Lambert 1994b). Work on basic feeding ecology would help elucidate the year-round needs and patterns of movement in the species.

REMARKS (1) Lambert (1994b) urged caution when assessing local reports of flocks (particularly if large) of cockatoos, which may actually refer to Pied Imperial-pigeon *Ducula bicolor*, which can appear all-white at long range; he witnessed such a mistake by guides on Bivouac Island in 1991. (2) The label of this specimen says "Cataguan". According to Dickinson *et al*. (1991:95) this is likely to be "Calaguan" and to stem from November 1836. The name Calaguan cannot however be traced, but Calauan must be the place in question. (3) Zimmer (1918b) reported that he found the species "abundant at all points visited except Dadagican", and for the purposes of this analysis his statement is taken at face value, so every locality he visited by day is listed, although not Dadagican itself. (4) The name *mcgregori* was established for the supposedly large birds present on Polillo (Hachisuka 1930), but Dupond (1942) had a specimen from Palawan just as large, and recommended no subdivision of *haematuropygia*.