

# Threatened Birds of Asia:

## The BirdLife International Red Data Book

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## YELLOW-CRESTED COCKATOO

### *Cacatua sulphurea*

Critical ■ A1c,d; A2c,d

Endangered □ —

Vulnerable □ C1



*This cockatoo has suffered (and may continue to suffer) an extremely rapid population decline, probably equivalent to >80% over three generations (given its longevity), owing to entirely unsustainable trapping for trade as household pets. It therefore meets the thresholds for Critical.*

**DISTRIBUTION** The Yellow-crested or Lesser Sulphur-crested Cockatoo (see Remarks 1) is a virtual endemic to “Wallacea” in the central archipelagos of Indonesia, and on Timor Loro Sae (East Timor), occurring in four races, including the remarkably large and almost extinct *C. s. abbotti* (see Remarks 2). In addition there are feral populations in Singapore and Hong Kong (Long 1981, Lever 1987). The general evidence suggests that it was formerly wide-ranging in the lowlands of every island on which it has been recorded, so that it probably originally ranged through all parts of all islands below around 1,000 m. Only in the wetter parts of north and central Sulawesi does it appear to have been naturally absent: it was referred to in the 1870s as only occurring “in certain sharply bounded areas” (von Rosenberg 1878:275), and as being “a rare bird, in this sense, that its distribution is a very interrupted one in Celebes” (Meyer 1879). Indeed, Meyer and Wigglesworth (1898) said: “In the Minahassa it is unknown as a wild bird... this also appears to be the case at Gorontalo, though it is to be met with on the coast of the Gulf at Paguatt and Posso, as also twenty miles from Gorontalo at Kuandang on the north coast, and again further west at Buol.” Its patchy abundance on the island was again noted in the 1930s (Stresemann and Heinrich 1939–1941); on the other hand, it was reported as still “widespread in small numbers” in the north and centre in 1978–1981 (Watling 1983b). Relentless trapping has now caused it to be absent (or so greatly reduced that it appears to be absent) from very many areas where it once occurred. The notion that it is present on Roti (off Timor) is covered in Remarks 3, the evidence that it occurs on Lomblen in Remarks 4. Specific records are as follows:

■ **INDONESIA** (race *sulphurea*) **Sulawesi** ■ **North Sulawesi** **Tangkoko-DuaSudara Nature Reserve**, where now possibly extinct (Coates and Bishop 1997), with none seen, 1991–1995 (M. F. Kinnaird *in litt.* 2000), although one, possibly an escape, was present in November 1998 (R. Drijvers *in litt.* 1999); **Likupang**, March 1916 (Riley 1924); **Manado**, in or before 1877 (specimen in RMNH); **Gorontalo**, undated (Meyer and Wigglesworth 1898); **Kwandang**, October 1864 (two specimens in RMNH), August 1871 (von Rosenberg 1878, Meyer 1879), before 1889 (male in BMNH), September–October 1914 (Riley 1924), and including islands in Kuandang Bay (Meyer 1879, Vorderman 1898a); **Sumalata**, by local report (Meyer 1879); **Tilamuta** (Tilamutan), August and September 1871 (Meyer 1879); **Bumbulan**, September and October 1939 (four specimens in MCZ); **Paguat**, July and August 1864 (six specimens in RMNH; Meyer and Wigglesworth 1898), 1871 (Meyer 1879); **Moutong**, August 1999 (K. D. Bishop *in litt.* 1999); ■ **Central Sulawesi** **Paleleh**, November 1914 (Riley 1924); **Buol**, August 1894 (Meyer and Wigglesworth 1895a, 1898); **Tomini**, nineteenth century (Schlegel 1862–1873); **Toli-toli**, November–December 1914 (Riley 1924); **Teluk Kapas** (Kapas Bay), July and November 1914 (Riley 1924); **Pasoso** island off the western isthmus of the northern peninsula, breeding in late 1995 (Mallo and Setiawan 1996), with 15 birds there, September 1999 (I. Setiawan verbally 2000); **Sibado**, November 1995 (Mallo and Setiawan 1996); **Tawaya**, August/September 1896 (Hartert 1897a); **Dongala**, August/September 1896 (Hartert 1897a); **Palu valley**, 1978–1982

(Andrew and Holmes 1990), showing a major diminution in numbers through the 1980s (K. D. Bishop *in litt.* 1999), November 1995 (Mallo and Setiawan 1996), with a captive bird from Palu Bay, February 1929 (male in IRSNB); **Sausu**, September 1978 (Andrew and Holmes 1990); **Lore Lindu National Park**, 1981 but not 1985 (Andrew and Holmes 1990), although local reports suggested a tiny population was still extant in late 1995 (Mallo and Setiawan 1996); **Poso**, August 1871 (Meyer 1879, Meyer and Wigglesworth 1898); **Rano Rano**, December 1917 (Riley 1924); **Taripa**, September 1995 (Mallo and Setiawan 1996); **Morowali National Park**, 1979–1980 (Andrew and Holmes 1990) but now extinct (Mallo and Setiawan 1996); Teteamut (untraced), February 1916 (Riley 1924); ■ **South Sulawesi** near **Rantepao** (including Toraja), November 1976, May 1979 and June 1989 (Andrew and Holmes 1990); **Maroneng**, Mandar Gulf, August 1895 (Meyer and Wigglesworth 1896, 1898); **Mandar**, by local report (Meyer 1879); **Sungai Bodjo**, late 1944 (Coomans de Ruiter 1951); **Bale**, October 1995 (Mallo and Setiawan 1996); **Maros**, date uncertain (in Meyer and Wigglesworth 1898); **Mandalli**, 1871 (Meyer 1879); **Karaenta reserve**, c.40 km north of Makassar, recently (Marsden 1993); **Makassar**, in or before 1878 (specimen in RMNH), 1940s (Coomans de Ruiter and Maurenbrecher 1948); **Bulukumba**, October 1978 (Andrew and Holmes 1990); **Jeneponto**, September 1978 (Andrew and Holmes 1990); plus local reports for South Sulawesi based on interviews: Palopo, Siwa, Singkang, Ujung Lamuru and Camba, early 1994 (Cahyadin *et al.* 1994b); ■ **South-East Sulawesi** **Kendari**, undated (Meyer and Wigglesworth 1898), including Maramo waterfall, south of Kendari, September 2000 (J. Robinson-Dean *in litt.* 2000); **Rawa Aopa Watumohai National Park** at Sungai Pampea, Gunung Watumohai, Lanowulu and Sungai Mempaho, September–October 1995 (Wardill *et al.* 1995, 1998), although in April–May 2000 birds were found at “Pampaea” and Laea-Hukaea and reported in August 2000 from Mempaho (D. Agista *in litt.* 2000);

**Muna Labasa** (untraced), October 1948 (van Bemmelen and Voous 1951); **Raha**, July 1909 (specimen in SMF);

**Buton** unspecified locality (see Meyer and Wigglesworth 1898); **Laweli** plus Kaweli, Lagunturu and La Bundo-Bundo, one individual, September 2000 (J. Robinson-Dean *in litt.* 2000); **Lasalimu**, at lake Togomotanu, one individual, August 2000 (J. Robinson-Dean *in litt.* 2000); **Maligano**, 1995 (Catterall undated), including November (Viney 1995); near **Baubau**, September 1948 (van Bemmelen and Voous 1951), including at Air Jatuh, November 1995 (Viney 1995) and 1996, this latter being the only known breeding site (Baltzer undated, Catterall undated, 1998);

**Tukangbesi** (islands) **Wanci** (island) (“Wantjee”), therefore evidently “Wangiwangi” island (on which there is a settlement called Wanci: see Catterall 1998), December 1901 (Hartert 1903b; specimen in AMNH) and still reported present in the 1990s (Catterall 1998); **Tomia** (island), December 1901 (Hartert 1903b; specimens in AMNH); **Binongko** (Binungku; see Remarks 5), December 1901 (Hartert 1903b; specimens in AMNH);

**Kayuadi** (“Kajoe Adi” on AMNH label), September 1927 (Meise 1929–1930; see Remarks 6);

**Tanahjampea** unspecified locality, December 1895 (Hartert 1896a, female in AMNH); unknown location or habitat, September 1993 (Dutson 1995);

**Kalao** unspecified locality, July 1927 (Meise 1929–1930; see Remarks 6);

**Madu** unspecified locality, May 1927 (Meise 1929–1930);

**Kalaotoa** unspecified locality, May 1927 (Meise 1929–1930); inland of **Latodo**, September 1993 (Dutson 1995);

(race **abbotti**) **Masalembu Islands Pulau Masakambing**, October 1993 and April 1994 (Cahyadin *et al.* 1994a), down to present (Putra 1998, Y. Cahyadin verbally 2000); **Pulau Masalembu** (Salembu Besar), December 1907 (Oberholser 1917);

(race **citrinocristata**) **Sumba Rokoraka**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Waikelo**, 1925 (Dammerman 1926b); **Yawila**, September 1992

(M. J. Jones *et al.* 1995, Marsden and Jones 1997), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Laora**, April 1925 (Rensch 1931b); **Lamboya**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Poronumbu**, September 1992 (M. J. Jones *et al.* 1995, Marsden and Jones 1997), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); (Rensch 1931b); **Luku Sobak**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Manupeu**, including Waimanu, Tengairi and Wanokaka, August 1991 (Riffel and Bekti 1991), August 1992 (M. J. Jones *et al.* 1995, Marsden and Jones 1997), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Langgaliru**, 500 m, May 1932 (Mayr 1944) and August 1992 (M. J. Jones *et al.* 1995), this apparently the site called Nerip in Marsden and Jones (1997), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Watubelan** (Watubolo), August 1991 (Riffel and Bekti 1991); **Lewapaku** (Lewa), September 1995 (Verbelen 1996), this site also being known as Wondut, October 1992 (N. Bostock *in litt.* 1999); **Napu**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Tabundung** (“Tagulodon”), 1979 or soon after (MacKinnon *et al.* 1982), October 1989 (M. J. Jones *et al.* 1995); **Mondu**, August 1991 (Riffel and Bekti 1991); **Praipaha Mandas**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Gunung Wanggameti**, 1979 or soon after (MacKinnon *et al.* 1982), September 1992 (M. J. Jones *et al.* 1995, Marsden and Jones 1997), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000), this site including “Tanjung Ngunju” (Nggongi), 1979 or soon after (MacKinnon *et al.* 1982), September/October 1989 (M. J. Jones *et al.* 1995); **Waingapu**, late 1896 (Hartert 1898e), May 1932 (Mayr 1944) and February 1978 (Kendall 1979); **Kandara**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Pangaduhahar**, September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Mao Marru**, June 1896 (male in AMNH), May 1925 (Rensch 1931b), June 1932 (Mayr 1944); **Lakahembi** (Laikayambi), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000); **Luku Melolo** (Praimbanan), February 1978 (Kendall 1979), February 1990 (Zieren *et al.* 1990), July/August 1992 (M. J. Jones *et al.* 1995, Marsden and Jones 1997), September–December 1995 (M. F. Kinnaird and T. G. O’Brien *in litt.* 2000), November 1998 (R. Drijvers *in litt.* 1999) and with nine birds released there, June 1999 (see Measures Taken);

(race *parvula*) **Bali** reported in the south-east (“the peninsula of Badong... where cockatoos are found, though not commonly” (W. Doherty in Hartert 1896b: 543) and at unspecified localities as an occasional visitor (see Population);

**Penida** in the south of the island at 300 m (Meise 1941); **Karang**, May 1986 (van Helvoort *et al.* 1986b), December 1994 (Setiawan 1996); **Sedihing**, December 1994 (Setiawan 1996);

**Lombok Narmada**, 200 m, March 1927 (Rensch 1931a); **Sembalun**, 1,185 m, May 1909 (two specimens in SMF, RMNH), 1,200 m, March/April 1927 (Rensch 1931a); **Sewela**, 400–700 m, 1927 (Rensch 1931a); **Pringabaya**, October 1894 (Vorderman 1895b); **Kalijaga**, October 1894 (Vorderman 1895b); between **Pancor** and Tandjong, October 1894 (Vorderman 1895b); hills above **Labuhanhaji**, June 1896 (Hartert 1896b); northern hills, mid-1896 (Hartert 1896c); **Labuan Tring**, south of Ampanam, June/July 1856 (Wallace 1869);

**Sumbawa Tongo/Sejorong**, December 1994 (Setiawan 1996), including RF2, 250 m, August 1993 (Butchart *et al.* 1996, Johnstone *et al.* 1996), upper Tatarloka River, seven birds in April 1997 (Martin and Barclay 1997), and the Batu Hijau (and hence the Selalu Legini) area (see Measures Proposed), where seven nests and 15 birds were found, March 1999 (I. Setiawan and Y. Cahyadin verbally 2000); **Merente**, May 1988 (Johnstone *et al.* 1996); **Lunyak**, mid-1990s (Behrens 1998); by local reports at Tangkan Pulit (west of Batu Dulanga) and at Sukamaju, December 1994 (Harun *per I.* Setiawan verbally 2000); **Batudulang**, 700 m, May 1927 (Rensch 1931a); **Semongkat**, 400 m, May 1927 (Rensch 1931a); **Brang Sumbawa** (Sumbawa river), August 1883 (Guillemard 1885); near **Sumbawa Besar**, sea-level, April 1927

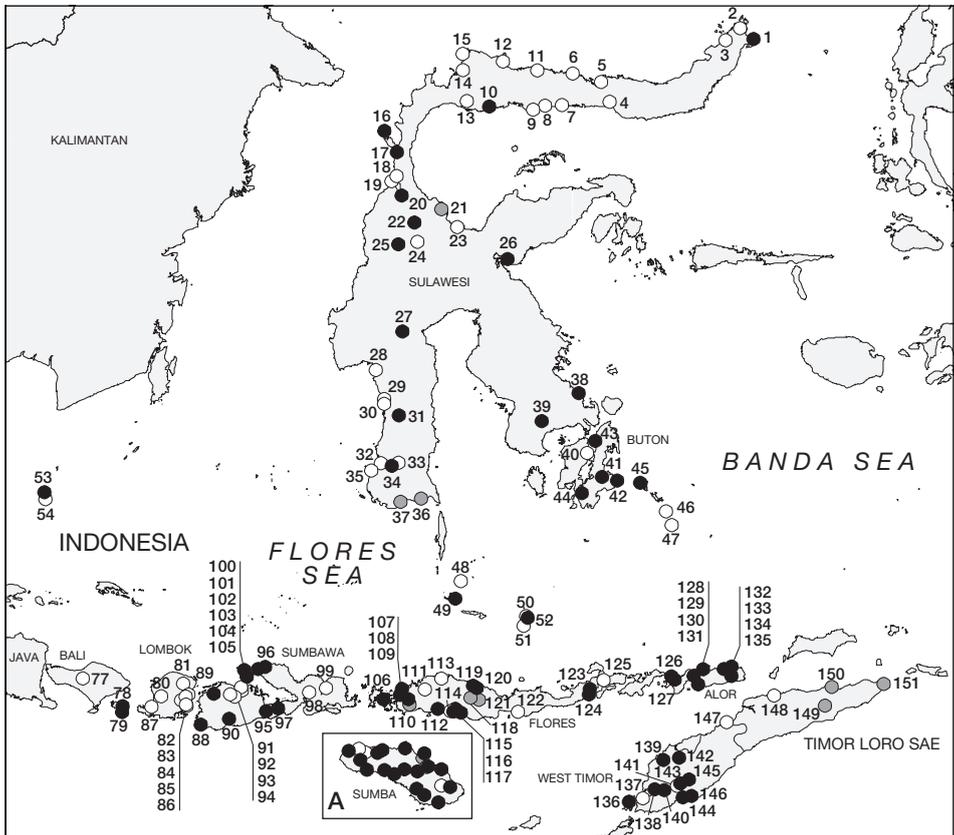
(Rensch 1931a); Lebangke/**Plampang**, December 1994 (Setiawan 1996); **Labuhan Kenanga**, total of 26 birds, November–December 1994 (Setiawan 1996); **Ampang** (Empang), December 1989 (Gibbs 1990); by local report, Gunung Olet Sangenges up to the mid-1980s (Butchart *et al.* 1996); **Dompu**, sea-level, May 1927 (Rensch 1931a); **Bima**, August 1883 (Guillemard 1885); possibly Wawó, 1927 (Rensch 1931a; see Population); possibly Gunung Tambora, early 1991 (see Remarks 7);

**Moyo** (335 km<sup>2</sup>, by Sumbawa) **Brangrea**, November 1999 (Setiawan *et al.* in press); **Labuhanaji**, November 1999 (Setiawan *et al.* in press); **Brangsedu**, December 1999 (Setiawan *et al.* in press); **Sera Nae**, November 1999 (Setiawan *et al.* in press); **Brangkua**, November 1988 (Johnstone *et al.* 1996) and November 1999 (Setiawan *et al.* in press); **Tanjung Pasir**, November 1988 (Johnstone *et al.* 1996), December 1999 (Setiawan *et al.* in press);

**Komodo Komodo National Park** (see Remarks 8), 0–100 m, September 1989 and June 1990 (Bishop 1992a) and down to present (many observers *in litt.* 1990s and 2000), and evidently including Wulia, August 1962 (two specimens in MZB), with confirmed and reliably reported sites in the period September–October 2000 being given under Population.

**Padar** listed by White and Bruce (1986) but the evidence is uncertain (but records would be inside Komodo National Park: see Remarks 8);

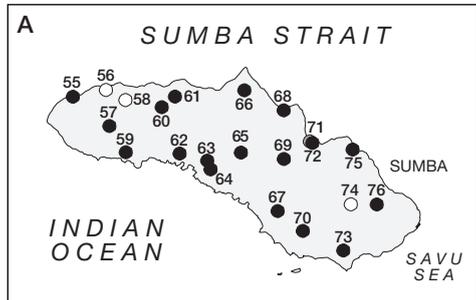
**Rinca** unspecified localities, June 1953 (Hoogerwerf 1955), 1950s (Pfeffer 1958), but in any case inside Komodo National Park (see Remarks 8), confirmed and reliably reported sites in the period September–October 2000 being given under Population.



*Flores* (see Remarks 9) **Mbura**, October 1929 (Rensch 1931b), including at Wae Wuul, August 1989 (Mochtar 1989a), with four birds in October 1997 (Sudaryanto verbally 1997); **Nggorang Bowosie**, August 1989 (Mochtar 1989a); **Mbeliling**, August 1989 (Mochtar 1989a) and near Labuanbajo, August 1992 (B. Gee *in litt.* 1999); **Nunang** (the only locality named in an account which implies widespread presence in the 1970s), undated (Schmutz 1977); **Sita**, June 1927 (Rensch 1931a); **Iteng**, 30 km south of Ruteng, 1–2 pairs breeding each December in 1990s (Lesmana *et al.* 1999); **Reo**, November 1888 (Büttikofer 1891, specimen in ZMA), 1911 (Rensch 1931b), 1913 (two specimens in MZB); **Mborong**, July 1927 (Rensch 1931a); **Nanga Rawa** (“Nanga Ramau”: Hartert 1898a), 10 m, September 1993 (Butchart *et al.* 1996); **Kisol**, February 1961 (egg in RMNH), with records of up to six birds in August 1987, August 1989 and August 1991, but none thereafter (B. F. King verbally 1998); **Bamo**, August 1998 (C. Trainor *in litt.* 1999); **Rembong**, April 1955 (two eggs in RMNH); **Ria**, August 1997 (Pilgrim *et al.* 1997, 2000); **Wolo Tado** (Nature Reserve), Riung, August 1997 (Pilgrim *et al.* 1997); **Soa**, November 1960 (egg in RMNH); **Ende**, August 1896 (Hartert 1898a, two specimens in AMNH); **Lewotobi** (mountain), September 1989 (Mochtar 1989b), including Watubuku, with two flocks of 15 and five in August–September 1998 (Lesmana *et al.* 1999, R. Drijvers *in litt.* 1999); **Ilenubi**, by Waiklibang, September 1989 (Mochtar 1989b); by local report, Kampung Langka seasonally in December and January (Butchart *et al.* 1996); by local report, Pulau Besar until recently (Butchart *et al.* 1996); **Larantuka** (“Larantouba”) on the east coast, in or before 1863 (Schegel 1862–1873; specimen in RMNH);

**The distribution of Yellow-crested Cockatoo *Cacatua sulphurea* (main map opposite; map A, Sumba, below):** (1) Tangkoko-Dua Sudara Nature Reserva; (2) Likupang; (3) Manado; (4) Gorontalo; (5) Kwandang; (6) Sumalata; (7) Tilamuta; (8) Bumbulan; (9) Paguat; (10) Moutong; (11) Paleh; (12) Buol; (13) Tomini; (14) Toli-toli; (15) Teluk Kapas; (16) Pasoso; (17) Sibado; (18) Tawaya; (19) Dongala; (20) Palu valley; (21) Sausu; (22) Lore Lindu National Park; (23) Poso; (24) Rano Rano; (25) Taripa; (26) Morowali National Park; (27) Rantepao; (28) Maroneng; (29) Mandar; (30) Sungai Bodjo; (31) Bale; (32) Maros; (33) Mandalli; (34) Karaenta reserve; (35) Makassar; (36) Bulukumba; (37) Jeneponto; (38) Kendari; (39) Rawa Aopa Watumohai National Park; (40) Raha; (41) Laweli; (42) Lasalimu; (43) Maligano; (44) Baubau; (45) Wanci; (46) Tomia; (47) Binongko; (48) Kayuadi; (49) Tanahjampea; (50) Kalao; (51) Madu; (52) Latodo; (53) Pulau Masakambing; (54) Pulau Masalembu; (55) Rokokaka; (56) Waikelu; (57) Yawila; (58) Laora; (59) Lamboya; (60) Poronumbu; (61) Luku Sobak; (62) Manupeu; (63) Langgaliru; (64) Watubelan; (65) Lewapaku; (66) Napu; (67) Tabundung; (68) Mondu; (69) Praipaha Mandas; (70) Gunung Wanggameti; (71) Waingapu; (72) Kandara; (73) Mao Marru; (74) Lakahembi; (75) Luku Melolo; (76) Pangaduharhar; (77) Bali; (78) Karang; (79) Sedihing; (80) Narmada; (81) Sembalun; (82) Sewela; (83) Pringgabaya; (84) Kalijaga; (85) Pancor; (86) Labuhanhaji; (87) Labuan Tring; (88) Sejorong; (89) Merente; (90) Lunyuk; (91) Batudulang; (92) Semongkat; (93) Brang Sumbawa; (94) Sumbawa Besar; (95) Plampang; (96) Labuhan Kenanga; (97) Ampang; (98) Dompur; (99) Bima; (100) Brangrea; (101) Labuhanaji; (102) Brangsedu; (103) Sera Nae; (104) Brangkua; (105) Tanjung Pasir; (106) Komodo National Park; (107) Mbura; (108) Nggorang Bowosie; (109) Mbeliling; (110) Nunang; (111) Sita; (112) Iteng; (113) Reo; (114) Mborong; (115) Nanga Rawa; (116) Kisol; (117) Bamo; (118) Rembong; (119) Ria; (120) Wolo Tado; (121) Soa; (122) Ende; (123) Lewotobi; (124) Ilenubi; (125) Larantuka; (126) Begonong; (127) Batu Putih; (128) Gunung Besar; (129) Halerman; (130) Tulen Dusun II; (131) Sungai Lendola; (132) Tuti Adagae Nature Recreation Park; (133) Sungai Taramana; (134) Pesomu; (135) Takala; (136) Semau; (137) Kupang; (138) Bipolo; (139) Gunung Timau; (140) Camplong; (141) Noilmina; (142) Amfoang; (143) Besi Pae; (144) Manipo Island Nature Park; (145) Soe; (146) Bena Plain; (147) Atapupu; (148) Fatunaba; (149) Ossu; (150) Baucau beach; (151) Tutuala.

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



*Pantar* unspecified locality, April 1897 (Hartert 1898d; male in BMNH); **Begonong** (Benggonong), November 1998 (Setiawan *et al.* in press); **Batu Putih**, November 1998 (Setiawan *et al.* in press);

**Alor Gunung Besar**, October 1989 (Mochtar 1989c); unspecified locality, March/April 1897 (Hartert 1898d); **Halerman**, November 1998 (Setiawan *et al.* in press); **Tulen Dusun II**, November 1998 (Setiawan *et al.* in press); **Sungai Lendola**, Kalabahi, October 1998 (Setiawan *et al.* in press); **Tuti Adagae Nature Recreation Park**, including Kami, Canary Forest area, Peto hill and Naikali, October 1998 (Setiawan *et al.* in press); **Sungai Taramana**, October 1998 (Setiawan *et al.* in press); **Pesomu**, November 1998 (Setiawan *et al.* in press); **Takala**, November 1998 (Setiawan *et al.* in press);

*Semau* unspecified locality, mid-nineteenth century (Schlegel 1862–1873; specimen in RMNH) and in 1994 (Behrens 1995);

*West Timor* Fatuqua, 200 m, c. 10 km south-east of **Kupang**, April 1911 (Hellmayr 1914); **Bipolo**, 1984–1993 (B. F. King verbally 1998, K. D. Bishop *in litt.* 1999), September 1991 (Hornskov 1992; also G. J. Speight *in litt.* 1991), mid-1993 (Noske 1995, Noske and Saleh 1996), October 1995 (Verbelen 1996), but apparently now vanished from the site (B. F. King verbally 1998, R. Drijvers *in litt.* 1999); **Gunung Timau**, May 1999 (Setiawan *et al.* in press); **Camplong**, July 1911 (Hellmayr 1914), January 1932 (Mayr 1944), August 1989 and August 1991 (B. F. King verbally 1998) and mid-1993 (Noske 1995, Noske and Saleh 1996); **Noilmina**, January/February 1932 (Mayr 1944); **Amfoang** (protected forest), November 1998 (Setiawan *et al.* in press); **Besi Pae**, mid-1993 (Noske and Saleh 1996); **Manipo Island Nature Park**, November 1998 (Setiawan *et al.* in press); **Soe**, mid-1993 (Noske and Saleh 1996); **Bena Plain** (hunting reserve), November 1998 (Setiawan *et al.* in press); **Atapupu**, August 1897 (Hartert 1898c, female in AMNH);

■ **TIMOR LORO SAE** (*East Timor*) (race *parvula*) **Fatunaba**, 500 m, inland of Dili, January 1883 (Forbes 1885); between **Ossu** and **Viqueque**, May 1974 (J. McKean and I. Mason *per* R. Noske *in litt.* 1999); **Baucau beach**, May 1974 (H. Thompson *per* R. Noske *in litt.* 1999); **Tutuala**, January and May 1974, and between **Secal** and **Tutuala**, May 1974 (H. Thompson *per* R. Noske *in litt.* 1999); near **Vero** (untraced), May 1974 (H. Thompson *per* R. Noske *in litt.* 1999); below **Gunung Lebetutu** (untraced), valley of the **Wai-Matang-Kaimauk**, April 1883 (Forbes 1885).

**POPULATION** From a review of all sources it is evident that the Yellow-crested Cockatoo was a common to abundant bird throughout its large range in central Indonesia in the nineteenth century, and that it sustained its numbers fairly well until the advent of international commercial trade in the 1970s. By the late 1980s it was apparent that the decline of the species had been “dramatic” and that it was “threatened throughout its range” (Collar and Andrew 1988, Andrew and Holmes 1990); Coates and Bishop (1997) referred to an “appalling population crash during the last 10–15 years”, although in reality this crash must have begun in the early or mid-1970s. So serious was the disappearance of the species from every part of its range that Andrew and Holmes (1990) expressed amazement at the trade figures in Inskipp *et al.* (1988) and commented that “it is hard to know where the bird is now trapped in such numbers”. An indication of the degree of obliteration of the species is the fact that the mere 14 birds recently recorded at **Ria, Flores**, were judged—albeit prematurely—to be the *second largest* population (after **Komodo**) of the race *parvula* (Pilgrim *et al.* 1997, 2000). The nominate *sulphurea* survives in tiny remnant numbers except perhaps for a small population in **Rawa Aopa Watumohai National Park**; the remarkable race *abbotti* is at a critically tiny level; *parvula* survives best on **Komodo** owing to the protection afforded by **Komodo National Park**; and *citrinocristata* persists in moderate but steadily declining numbers on **Sumba**.

*Sulawesi* In the nineteenth century the species was “rare” in the sense of being extremely patchy, the first large flocks being found at Poso on the north-facing coast of the Gulf of Tomini (Meyer 1879); but at Teteamut in 1917 it was considered common (Riley 1924). In 1981 it was “regularly observed” in Lore Lindu National Park, but was not found there in August 1985 (Andrew and Holmes 1990), although a tiny population may survive (Mallo and Setiawan 1996). In the early 1990s interviews with rural people over 40 years old in North, Central and South Sulawesi revealed that the species has become so rare everywhere that only tiny remnant populations were known, scattered very widely through the landscape (Cahyadin *et al.* 1994b, Mallo and Setiawan 1996; also Baltzer 1990). In the course of a year’s surveying of frugivores in North Sulawesi, 1999, the species was not seen once (A. Cahill and J. Walker *per* S. J. Marsden *in litt.* 1999). However, there were seven encounters at four locations within Rawa Aopa Watumohai National Park in the south-east peninsula in under four weeks during 1995, including one sighting of 19 birds, and thus the area is judged to hold an “internationally important population” of the species (Wardill *et al.* 1995, 1998); Catterall (undated) reported that this population was “only c.150 birds”, but the source of this figure is not known, while in April–May 2000 18 birds were seen at Laea-Hukaea and 10 at Pampaea within the park, 23 were reported at Mempaho in August 2000, and local people reported a significant decline in the area of the park since the 1970s, when the species was considered an agricultural pest (D. Agista *in litt.* 2000).

*Muna* There appears to be no direct information since 1948, but in 1995 people from the island reported that the species was still present in small numbers, but was formerly numerous (J. C. Wardill *in litt.* 1999).

*Buton* In the first half of the nineteenth century S. Müller found the species “in large numbers” (Meyer and Wigglesworth 1898). It was still “more or less regularly recorded” on the island in mid-1981 (Schoorl 1987), but given the trade pressure the population was expected to suffer as soon as it was discovered by trappers (Andrew and Holmes 1990). In 1995 19 birds were recorded and in 1996 34, all in the south; the total population was then guessed at 50–100 birds, decreasing with intense illegal trapping pressure (Catterall undated, 1998).

*Tukangbesi* No data on current numbers (if any) are available. A week-long visit to the island in September 2000 produced no records (J. Robinson-Dean *in litt.* 2000).

*Kayuadi* There appears to be no information since 1927.

*Tanahjampea* The species was “reported to have been trapped almost to extinction” during a visit in 1993, when a single pair was seen in two days’ fieldwork (Dutson 1995).

*Kalao* There appears to be no information since 1927.

*Madu* There appears to be no information since 1927.

*Kalaotoa* In 1993 local people reported that although they trapped the species it was “not rare” (Dutson 1995).

*Bali* Some free-flying birds, said to be imported from Lombok and not to breed on Bali, were seen there in 1911, and no clear evidence of a surviving indigenous population could then be found, despite searches in Denpasar market (Stresemann 1913). According to Ash (1984), large numbers irregularly irrupt from the east.

*Penida* In 1911 local reports on Bali suggested the species was “rather common” on Penida (Stresemann 1913). However, in 1986 it was already considered close to extinction (van Helvoort *et al.* 1986b). The decline was said to have begun around 1982/1983, and by 1994 only two populations could be found, four plus one chick at Karang and three (which had not bred in six years and were assumed to be the same sex) at Sedihing (Setiawan 1996). In October 1998 a survey in collaboration with KPB Kokokan found only six birds in two locations (PHPA/LIPI/BirdLife International-IP 1998).

*Lombok* In June and July 1856 the species (“small white cockatoos”) was “abundant... and... a very important feature in the landscape” at Labuan Tring, south of Ampanam, and indeed it was generally noted that “among the commonest birds in Lombok [*sic*] were white

cockatoos" (Wallace 1869). In 1894 the species was found in flocks of 8–10 in the interior (Vorderman 1895b). At two 1927 collecting localities, Swela and the Sembalun plateau, it was listed as among the typical and most frequently encountered species, and in general it was then "not rare" (Rensch 1931a). Although considered probably extinct on the island by the mid-1990s (Behrens 1995, 1998), one bird was seen in 2000 (C. Trainor *per* R. F. A. Grimmett *in litt.* 2000).

*Sumbawa* In 1883 the species was "met with in flocks on the Sumbawa River" (Guillemard 1885). In 1927 it was one of the typical and most frequently encountered species in bush steppe and monsoon forest at Dompou and (based on the remark "Vogelwelt ähnlich wie in Dompoe") at Wawó, and in general the species was then "not rare" on the island (Rensch 1931a). Islanders mostly judged that the decline began around 1990, and as many as 118 people interviewed recalled flocks in the hundreds in the period 1945–1960 (Setiawan 1996). The species was clearly rare in the late 1980s and early 1990s, and regarded as close to extinction (Butchart *et al.* 1996, Johnstone *et al.* 1996), a view supported by independent searches in the mid-1990s (Behrens 1998; see Threats).

*Moyo* According to Beudels and Liman (1981), based on their work in early 1981, some 1,600 cockatoos were then present on this small island. The species was "moderately common" on the island in 1988, with small groups of up to five birds recorded at two sites (Johnstone *et al.* 1996). However, only small flocks could be found there after long, hard searches in the mid-1990s (Behrens 1998). In November–December 1999 a survey of the island produced records of only 10 birds, with local people reporting that the population crashed in the 1980s when the island was visited by trappers from several different islands (Setiawan *et al.* *in press*, D. Lesmana verbally 2000).

*Komodo* The species was apparently numerous in the 1950s (see under Flores below). On one morning in September 1989 around 20 were observed (Bishop 1992a), and, although "only a few" were seen there the following year (Bishop 1992a), over 30 were seen in November 1992 (N. Bostock *in litt.* 1999) and there were "healthy numbers" (flocks of up to 20) present in September 1993 (Butchart *et al.* 1993) and through 1995 (M. F. Kinnaird *in litt.* 1999). Large flocks, e.g. as many as 100 together in April 1999, can sometimes be seen (I. Mauro *in litt.* 1999). In late 2000 a population of 600 birds was estimated for Komodo and Rinca (Komodo National Park): these figures broke down as 500 birds on Komodo, at (numbers in brackets after each site) Loh Wenci (6), Sok Keka (15), Loh Boko (10), Loh Sebita (82), Banu Nggulung (55), Poreng (134, in one loose flock), Loh Lawi (17), Loh Wau (44) and Loh Gebah (36), plus an estimated 100 birds distributed amongst the reported sites of Loh Serikaya, Loh Letuho, Loh Sera, Loh Belanda and Tanjung Kuning (D. Agista *in litt.* 2000).

*Padar* There is no information (see Distribution).

*Rinca* The species was apparently numerous in the 1950s (see under Flores below; also Komodo above), although in June 1953 Hoogerwerf (1955) considered it rare on the island, only seeing it two or three times. Nevertheless, around 100 birds were judged to survive there in late 2000, with 32 seen at Kerora, 21 at Kampung Rinca and around 50 estimated amongst the reported sites of Loh Dasami, Loh Tongker, Loh Baru and Tanjung Tambora (D. Agista *in litt.* 2000).

*Flores* In general the species was "not rare" in 1927 (Rensch 1931a). In the 1950s it was "numerous" (flocks of 10–20) in gallery forest on Flores and apparently also Rinca and Komodo, with flocks of 40–60 assembling in fig trees in montane forest (Pfeffer 1958). In the 1970s the species was found "in large noisy flocks" (Schmutz 1977) and indeed into the early 1980s it was "very common all over the island", but by 1990 it had suffered severe losses (Verhoeve undated). It was reported by locals to have declined in the years prior to 1993, and was then considered very likely "close to extinction" (Butchart *et al.* 1996), a view independently supported by Holmes (1993c), who failed to observe the species at all in a visit from late July to mid-October 1993. In August 1997 at least 14 birds were observed at Ria, but this was

presumed to be the largest remaining flock of the species on the island (Pilgrim *et al.* 1997). The total population of Flores in 1998 was judged to be 200–400 birds (C. Trainor *in litt.* 1999).

*Pantar* In 1994 the species was found to survive on the island in the face of much deforestation and continued trapping pressure (Behrens 1995), and in November 1998 a total of 29 birds were found at two sites (Setiawan *et al.* *in press*).

*Alor* In 1994 the species was found to survive on the island in the face of much deforestation and continued trapping pressure (Behrens 1995). The population has been “decimated” (Coates and Bishop 1997). However, in October–November 1998 a total of 80 birds were found at seven sites (Setiawan *et al.* *in press*).

*Semau* The species was still present in 1994 (Behrens 1995), but numbers are not known.

*West Timor* The species has recently been described as “uncommon and declining” (Coates and Bishop 1997). However, in two months spent on the island, 1993, the species was unrecorded (Holmes 1993b), and in 10 days of intensive fieldwork there in 1995 only one pair was encountered (Verbelen 1996), so the situation appears far worse than conveyed by the word “uncommon”. A total of 18 birds were encountered in 1998 in Manipo Island, Amfoang and Dataran Bena (see Distribution), but in 1999 only a single bird could be found, on Gunung Timau (see Distribution).

*Sumba* It was clearly very common in the last century, when Doherty (1891) wrote that “among birds cockatoos are so numerous that I have seen the trees white with them!” (also Hartert 1896b), but as early as 1925, while it was very common in the west around Waikelo, it was absent from around Waingapu owing to trapping for sale in Java (Dammerman 1926a,b). This situation evidently changed somewhat for the better, since Riffel and Bektı (1991) had reports of its abundance around Waingapu into the 1970s, when a dramatic decline occurred throughout the island. Riffel and Bektı (1991) reported on two internal anonymous studies in the 1980s intended to help determine capture quotas: the first, conducted in 1986, yielded an estimated total of 12,000 birds with a density of 8/km<sup>2</sup> in appropriate habitat; the second, conducted in 1989, apparently yielded no total number but discovered that density had dropped to 1.8/km<sup>2</sup>, an apparent decline of 80% in three years (with prices rising concomitantly, from Rp 25,000 per bird in 1985 to Rp 100,000 in 1991. Fieldwork in 1989 led to an estimated population of 3,997 (range 799–7,195) (Jones and Marsden undated), but when this work was combined with results from 1992 (still qualified by the authors as incomplete) a density of 2.2±1.1 birds per km<sup>2</sup> was revealed, and on the basis of there being 1,080 km<sup>2</sup> of closed-canopy forest a population of 2,376±1,188, rounded to a likely true figure of 3,200, was tentatively estimated; on this basis it was judged that “there can be no doubt... that... *C. sulphurea* is seriously, and perhaps critically, endangered on Sumba” (M. J. Jones *et al.* 1995; see also Marsden 1999b). Moreover, the effective breeding population may be much lower owing to delayed maturation or, conversely, the number (and age) of breeding birds may be disproportionately high owing to the depression of recruitment through the capture of young for trade (M. J. Jones *et al.* 1995) (these two considerations apply to all populations). In the early 1990s densities appeared to be highest in areas where nest-holes were inaccessible to local bird-catchers (M. J. Jones *et al.* 1995). In 1995 villagers reported the species “becoming increasingly rare” in the vicinity of Lewapaku, owing to trapping (Verbelen 1996).

*Masalembu Islands* When W. L. Abbott first found the endemic form *abbotti* in December 1907, he “reported it in hundreds” on Masalembu (Oberholser 1917). Although cockatoos were “easy to see” on the two range islands until the early 1980s, they have now gone from Masalembu (Salembu Besar), only 8–10 birds remained on Masakambing in early 1994, and the species may never have occurred on the third island, Keramaian, 55 km distant (Cahyadin *et al.* 1994a). Seven birds were present in 1996 (Darjono *et al.* 1997), while in July and August 1998 the population on Masakambing was eight birds, of which two were young (Y. Cahyadin and I. Setiawan verbally 2000).

*Timor Loro Sae* (*East Timor*) At Fatunaba south of Dili the species “abounded” in January 1883 (Forbes 1885); this appears to be the only published assertion that it was ever at all common on Timor. In 1999 a brief survey of the country was conducted by PKA staff and the species was confirmed still present, with local people apparently reporting a very few birds (1–2) at every site visited (21) (Ora 2000, C. Trainor *in litt.* 2000).

**Introduced populations** The status of the feral populations in Singapore and Hong Kong (Long 1981, Lever 1987) is not well known. In July 1998 the species was locally common in south and east Singapore, including the islets of St John’s and Sentosa, reportedly breeding in gardens and parks, and possibly numbering around 30–50 birds (PHPA/LIPI/BirdLife International-IP 1998). Although it has been assumed that the Hong Kong population might be insignificant or extirpated (PHPA/LIPI/BirdLife International-IP 1998), at least 200 birds are considered to be living free there at present (Reinschmidt 1999).

**ECOLOGY Habitat** This is a bird of primary and tall secondary lowland and hill forest and forest edge, scrub and agriculture (Sulawesi), moist deciduous monsoon forest and gallery forest (Nusa Tenggara), and adjacent areas of lightly wooded scrub and cultivation, mainly in the lowlands to 1,200 m (Pfeffer 1958, Watling 1983b, Butchart *et al.* 1996, Coates and Bishop 1997); the species eats many cultivated foods, so a high proportion of records (where any records exist) are from in the neighbourhood of settlements (C. Trainor verbally 2000). On Sumba, where the importance of tall trees (only on ridgetops and in valley bottoms) to the species was noted in 1978 (Kendall 1979), it is heavily dependent on closed-canopy (primary) forest at low altitudes (mainly in valley bottoms), although it ranges out into open country (M. J. Jones *et al.* 1995). The origin of the notion that it is “not inside forest” (White and Bruce 1986) is untraced, but the degree of dependence on forest shown by this species is still unclear: despite its association with closed-canopy forest on Sumba (Jones *et al.* 1995, O’Brien *et al.* 1997), the case of Masakambing (Masalembo) (see Threats), where all original habitat except the mangroves has been cleared, indicates that substantial modification of landscape can occur without the total loss of the species. In Komodo National Park birds were in dry coastal monsoon woodland and thorn scrub, September (Bishop 1992a, Butchart *et al.* 1996), but commonly also use mangroves (M. F. Kinnaird *in litt.* 1999). On Sumbawa birds were seen in semi-evergreen forest and roosting in tall riverine forest dominated by *Duabanga moluccensis*; on adjacent Moyo it was present in “rainforest and gardens” (Johnstone *et al.* 1996; also Butchart *et al.* 1996). On Flores it penetrates cultivated land and has been recorded in remote savanna at Wae Wuul (Sudaryanto verbally 1997), but it is dependent for breeding on tiny fragments of lowland forest (tall buttressed *Canarium* and *Ficus* trees) growing around small springs (C. Trainor *in litt.* 1999). On Sumba birds are absent or rare in forests of under 10 km<sup>2</sup>, and they prefer undisturbed primary forest characterised by large trees offering nest sites (Kinnaird 1999). It may be the presence of large fissured trees in closed-canopy forest on Sumba that is the key feature that associates birds on Sumba with closed-canopy forest, since on islands such as Masakambing, Alor and Pantar no closed-canopy forest exists, but trees with holes are found in old coconut groves, mangroves and narrow riverine formations (PHPA/LIPI/BirdLife International-IP 1998). Birds tend to feed in the lower canopy, occasionally on the ground (Coates and Bishop 1997). Roosting in mangroves on Masakambing (Masalembo) was reported by local people (Cahyadin *et al.* 1994a, Putra 1998) (although this has now ceased: F. Arganarata, A. Kristianto, E. Putra *in litt.* 1999), and the use of mangroves and other low-lying coastal vegetation has been noted in Nusa Tenggara (Behrens 1995); on Sulawesi high trees were noted to be used for roosting (Meyer 1879). Some island elevations in Coates and Bishop (1997) differ from those available under Distribution. The highest elevation apparently recorded is “5,000 feet” (1,500 m) for a Lombok specimen (in AMNH). On Muna and Buton specimens were collected at the coast (ZMA label data), and most observations on Moyo

were near the sea (Behrens 1995); there generally seems to be a preference for coastal regions, possibly related to use of mangroves.

**Food** The list of foods in Forshaw (1989) (“seeds, nuts, berries, fruits and probably blossoms”) is a standard, probably entirely accurate formula, but not based on records. Schmutz (1977) reported that on Flores birds used to raid rice and maize crops, and he also indicated that birds visited blossoming and greening woodland, which presumably means that they feed on fresh plant parts. Maize crop depredation was also reported on Sumba (Kendall 1979). On Sulawesi interviews with local people in 1995, combined with direct observation, resulted in 14 food-plants being recorded (c = cultivated, w = wild, r = reported, o = observed): fruits/seeds of maize *Zea mays* (c,r), banana *Musa* (c,r), mango *Mangifera indica* (c,r), papaya *Carica papaya* (c,r,o), fig *Ficus* (w,r), guava *Psidium guajava* (c,r), jambu bol *Eugenia malaccensis* (c,r), “kedondong batu” (w,r), “marang taipa” (w,r), prickly pear *Opuntia elation* (introduced, r,o), srikaya *Annona squamosa* (c,r), flowers of coconut *Cocos nucifera* (c,r) and tamarind *Tamarindus indica* (w,r), and flowers and fruit of the mangrove *Avicennia* (w,r,o) (Mallo and Setiawan 1996); and on Pasoso Island off the north coast food includes fruit of marangtaipa *Dehaasia* and young leaves of *Sonneratia* (I. Setiawan verbally 2000). In Rawa Aopa Watumohai National Park in the south-east a key food appears to be “biti” *Vitex cofassus* (D. Agista *in litt.* 2000), and birds were seen feeding on fruit of a tree known locally as “ninifo” and thought to be a *Canarium* (Wardill *et al.* 1995). Coconut flowers, mangrove seeds, occasional maize and beans were reported as food on Masakambing (Masalembo), and young coconut fruit were observed being taken (Cahyadin *et al.* 1994a); also *Ceiba pentandra*, *Borassus flabellifer* (flower) and *Averrhoa bilimbi* (fruit) (F. Arganarata, A. Kristianto, E. Putra *in litt.* 1999). On Flores young birds were seen eating tamarind fruits (Pfeffer 1958). On Sumbawa the following food-plants were identified: maize (c,o), mango (c,o), coconut (c,r), tamarind (c,o), kore *Calotropis gigantea* (w,o), tonang *Aphanamixis polystachya* (w,r), rice *Oryza sativa* (c,o), kelor *Moringa oleifera* (wlc,o), sorghum *Andropogon sorghum* (c,r), dadap *Erythrina fusca* (c,o), kemiri *Aleurites moluccana* (w,r), fig *Ficus benjamina* (w,o), randu *Ceiba pentandra* (c,r), peli and peto (unknown) (w,r) (Setiawan 1996). On Pulo Moyo the birds favoured *Protium javanicum* fruits (Behrens 1995). In Komodo National Park *Tamarindus indica*, *Calotropis gigantea*, *Ardisia* and *Cordia dichotoma* have been recorded as foodplants (D. Agista *in litt.* 2000). The species was considered “a noxious bird” for its attacks on “even full-grown cocoa-nuts” and its destruction of young fruits of *Ceiba* and “*Gossampinus*” (presumably *Coccygium*), which are left “scarcely eaten” (van Bommel and Voous 1951). On Sumba birds have been found to undertake short flights throughout the day, rather than longer questing flights at dawn and dusk as recorded in certain parrots (Marsden 1999a), perhaps suggesting a high local availability of foods.

**Breeding** As in all cockatoos, the sexes in this species form very strong bonds; Schmutz (1977) reported how the widowed mate of a bird he shot from a crop-raiding flock and hung up (in a vain attempt at discouragement) returned several days later to sit in silence close to the body of its partner.

The nest is in a tree hollow and in captivity up to three eggs are laid (Forshaw 1989). A remarkable exception was the discovery in November 1995 of five nest burrows, at least two of them active with two eggs each, in a low cliff (10 m high) in a river valley in the Palu valley, Sulawesi: two burrows were 6 m up the cliff, the other three 7–8 m (Mallo and Setiawan 1996). The breeding season appears protracted; White and Bruce (1986) gave September–October for Buton and April–May for Nusa Tenggara, but in reality the situation is considerably more complicated. Apart from the cliff nests with eggs in November above, on Masalembo (Masakambing) nest prospecting was witnessed (in a coconut palm) in October, and nesting reported in coconuts in November/December (Cahyadin *et al.* 1994a, Putra 1998); on this island birds also nest in kapok *Ceiba pentandra* and mangroves *Avicennia marina* in July–August (F. Arganarata, A. Kristianto, E. Putra *in litt.* 1999). On Buton and Muna,

some but not all birds were in breeding condition in September/October, the main choice of tree being *Gossampinus* (van Bemmell and Voous 1951); on Buton in 1996 a pair seen entering a nest-hole in mid-July were still occupying the site in November (Catterall undated). On Flores, five nests were recorded in November (one), February (one) and April (three) (Verheijen 1964); two young males not fully fledged were brought in at the end of April, and gonads of a female from July were slightly swollen (presumably following breeding, since these two pieces of evidence were taken to indicate a breeding season in March and April) (Rensch 1931a). Young birds, apparently just fledged, were also seen on Flores in April (Pfeffer 1958). A pair was investigating a potential nest-hole in a tree at the edge of forest in September on Tanahjampea (Dutson 1995). In Komodo National Park nesting is reported to commence in September–October, with incubation chiefly November–December and fledging in February–March (D. Agista *in litt.* 2000). A female on Sumba had swollen ovaries in April (Rensch 1931b) while a male on Timor had fairly enlarged testes in January (AMNH label data).

Of 46 active or old nests found (in August–October) on Sumba, all but two were in deciduous trees and 68% were in two species of *Tetrameles* (Datiscaceae), one of them *T. nudiflora*; although largely evergreen forests held the highest densities, it was the relatively few deciduous trees (usually emergents) that were mainly selected for nesting (Jones *et al.* 1995, Marsden and Jones 1997). On Nusa Penida, two nest-trees (also used as roost-sites) were kepah *Sterculia foetida* and kutuh (unknown), holes 6–10 m up, with two eggs reported as the normal clutch (Setiawan 1996); five males in late February and early March had small testes and were in full or partial moult (Meise 1941). In Rawa Aopa Watumohai National Park the nest trees are “kuiya” *Alstonia scholaris* and, by local report, “kayu nona” *Metrosideros petiolata* (D. Agista *in litt.* 2000). On Sumbawa local inhabitants reported that the most frequently used tree for nesting is binong *Tetrameles nudiflora*, with nest-holes usually in the trunk some 10 m up; other wild-growing trees observed for nesting were *Ficus benyamina*, kelanggo *Duabanga moluccana* and awo (unknown), and in addition local people reported coconut, tamarind, *Erythrina*, *Ceiba pentandra*, *Macaranga*, *Eugenia*, *Garuga floribunda*, kaba, dorofotofore and rimas (unknown) (Setiawan 1996). In Komodo National Park 14 nest trees were found, shared between just three species: *Sterculia foetida*, *Borassus flabillifer* and *Sonneratia* (D. Agista *in litt.* 2000). People on Sumbawa reported that two eggs are laid; one respondent reported a nest with eggs in September 1992 which took 23 days to hatch (Setiawan 1996). On Masakambing the islanders reported that the nestling period is 65 days; if this and the incubation period are accurate, then the time from laying the eggs to leaving the nest is 88 days, i.e. almost three months (PHPA/LIPI/BirdLife International-IP 1998, Putra 1998). However, there is always a period of dependence after fledging when they young parrots follow their parents and slowly integrate into flocks; in the case of large species, including cockatoos, this period can apparently be several months (see, e.g., del Hoyo *et al.* 1997). There is usually a period of some weeks of occupation of the nest site before laying begins, so it is probable that a typical breeding cycle from preparation of the nest to independence of the young is in the order of eight months, possibly longer; age of first breeding is not known, but may well not be in the first year (PHPA/LIPI/BirdLife International-IP 1998).

**Migration** On Bali birds “arrive irregularly in large numbers in irruptions from the east” (Ash 1984), which indicates occasional nomadism in response, presumably, to some food failure within its range.

**THREATS Trade** Although there can be no doubt that habitat loss must have contributed substantially to an overall decline in the species, the blame for the precipitous drop in numbers in the past quarter of a century lies with entirely unsustainable exploitation for trade. What proportion of such trade has been simply internal and therefore unmonitorable through CITES is not known, but the evidence suggests that it was international demand that virtually alone created and developed the comprehensive trapping networks and programmes that

have effectively eliminated the species. Nevertheless, as noted under Population (Sumba), internal trade to Java had had a local effect as early as 1925.

For many years this was the most freely available of the world's cockatoos, and was traded in large numbers, being inexpensive in Europe until the mid-1970s (Inskipp *et al.* 1988). Around 1980 it was found that there was a regular export trade of cockatoos via Denpasar direct to San Francisco, and concern was then expressed that control of its trade should be imposed (MacKinnon *et al.* 1982). Fieldworkers in Sulawesi in the 1990s were informed that in the 1980s teams of trappers from Makassar travelled all over the island to trap out birds at roost sites (J. C. Wardill *in litt.* 1999). Official CITES import reports, 1981–1985, indicated the following numbers originating from Indonesia: 3,495 in 1981, 4,284 in 1982, 6,447 in 1983, 7,681 in 1984, and 5,199 in 1985 (Inskipp *et al.* 1988). These figures greatly exceeded those reported by Indonesia itself (1,965, 2,562, 2,986 and 3,990 for the years 1981–1984), for reasons unknown (Inskipp *et al.* 1988). There is a table in Inskipp *et al.* (1988:197) which sets out three years of quotas, 1985–1987, including region of origin, but it appears that these figures were decided without reference to field data and do not reflect knowledge of the status at the time in the areas indicated (T. P. Inskipp verbally 1999).

According to officially recorded CITES data, as many as 96,785 birds were recorded as exported from Indonesia in the period 1981–1992; while it may well be that some of these were in fact the very similar but legally protected Sulphur-crested Cockatoo *Cacatua galerita*, the CITES figures represent *minima* caught from the wild for several reasons, including smuggling, domestic trade and death before export (PHPA/LIPI/BirdLife International-IP 1998). There is strong circumstantial evidence that over 1,000 birds were smuggled onto the global market via Singapore in the three years after 1993, when exports of the species became illegal (PHPA/LIPI/BirdLife International-IP 1998). The species is still displayed openly in two of Jakarta's bird markets, despite full protection at the start of 1999: in the course of that year, roughly 6–20 birds could be seen in these markets on a monthly basis (M. Indrawan *in litt.* 1999). In 1998 and 1999, Singapore exported 81 birds recorded as having been wild caught in Indonesia (U. Grimm *per* R. F. A. Grimmett *in litt.* 2001).

The following account is arranged by island (where a threat is known), the better to convey the issues.

*Sulawesi* Evidence of the rate of forest loss in lowland Sulawesi, to which this cockatoo is confined on the island, is presented in Threats under Blue-faced Rail *Gymnocrex rosenbergii*. The species was much traded in the 1940s (Coomans de Ruiter and Maurenbrecher 1948). It was “a favourite cage bird in the towns” in Central and North Sulawesi, 1978–1981 (Watling 1983b). The trans-Sulawesi highway has simplified human access to monsoon woodland in the north of the island, and facilitated both the trading of the species and the settlement of its habitat by transmigrants; moreover, monsoon woodland is patchy and sparse on Sulawesi and, because it is easy to burn, it is liable to much more rapid clearance than wetter forest (K. D. Bishop *in litt.* 1999, 2000). In the south-east the evidence of local people (including staff at Rawa Aopa Watumohai National Park) is that it was common enough to be considered an agricultural pest around 1965, so that birds coming to corn crops were caught using lime or nets and sold; however, capture evidently also took place inside the park borders, since in 1983 a shipment of 200 birds was confiscated there (Wardill *et al.* 1995). In September 1998 it was reported that a land-ownership dispute had led to occupation of the southern section of the park by settlers, which could have very serious repercussions for the cockatoo (J. C. Wardill *in litt.* 1999). Transmigrant pressure was certainly high in August 2000 (J. Robinson-Dean *in litt.* 2000), and at that time it was determined that many areas inside the park had been converted from forest to cacao plantations (D. Agista *in litt.* 2000). In 1989 the species was considered the most commonly traded in the province of South Sulawesi, with a quota of 1,800 individuals per year, in spite of there being almost no recent official records in the wild (Baltzer 1990).

*Buton* Trade in birds from Buton was evidently substantial in the nineteenth century, when cockatoos were “plentiful” on the island, the birds being shipped to markets in Makassar and Kendari (Meyer 1879). Nevertheless, despite the common capture of specimens, in 1948 numbers seemed “not to have diminished since 1828” (van Bemmelen and Voous 1951). However, today the species is “under enormous pressure” from trapping for the pet trade, despite full legal protection: it is readily available for US\$50 each in markets at Kendari (on the adjacent mainland), locally trapped birds can be seen throughout the island, and in November 1996 two were shot and wounded by local trappers at the island’s only known breeding site (Catterall undated, 1998). Buton has recently been designated a transmigration site despite its limited size and suitability: forest in the south, although largely confined to steeper slopes and classed as watershed protection forest, is now being targeted by loggers, and the north is not secure (Catterall 1998; see Threats under Snoring Rail *Aramidopsis plateni*).

*Tanahjampea* Trapping had led to the virtual extinction of the species by September 1993 (Dutson 1995).

*Tukangbesi* There was evidently a lively trade in the species from the Tukangbesi islands in the nineteenth century (see Remarks 5).

*Kalao* The island of Kalao “appeared to be largely forested”, although presumably logged, in 1993 (Dutson 1995).

*Penida* Islanders reported that the capture of birds (almost exclusively by taking young from nests) was in part a response to the impact of the species on maize crops (Setiawan 1996), although the prices they obtained from the sale (roughly around 100,000 Rp per bird in the 1980s; Setiawan 1996) indicate that taking birds had an economic value entirely independent of crop protection.

*Lombok* People on Sumbawa indicated in 1994 that much of the trapping on their island was undertaken by trappers from Lombok, who were well known for their skills in this business (Setiawan 1996); it might be inferred that by the 1980s these trappers had been too successful on their own island, and the extinction of the cockatoo there had caused them to take their skills elsewhere. Precisely a hundred years before, birds on Lombok were being trapped and sold on the west coast by birdcatchers from Surabaya, Java (Vorderman 1895b).

*Sumbawa* In the 1970s the birds were thought a pest on rice, maize and wheat, and capture (generally undertaken between February and May) was one way of mitigating this pressure (Setiawan 1996). Most respondents blamed the decline on hunting and trapping for trade, much of which had been stimulated by outside contact with South-East Asian countries starting in the 1960s, but some (15%) indicated that conversion of natural forest to wet and dry agriculture (partly with the opening of transmigration areas) had exacerbated the process, and an equal number mentioned that the use of pesticides since around 1989, including poisoning to reduce pig numbers, had had an effect; it was also concluded that the development of transport facilities on the island had facilitated access both for trappers and for those with an interest in converting forest (Setiawan 1996). In the mid-1990s remnant populations were still being caught, even by trappers from Lombok (Behrens 1998).

*Moyo* In the 1980s trappers from many islands came to Moyo and virtually trapped out the island (D. Lesmana verbally 2000). Even so, in the mid-1990s trappers were still frequently to be found inside the island’s protected area, and the remaining birds were evidently under enormous pressure there (Behrens 1998).

*Komodo* Trapping away from the park headquarters is reported by park guards (Butchart *et al.* 1996). This is not considered a major problem currently, however; but opportunistic shooting or trapping by deer-poachers is a concern (D. Agista *in litt.* 2000). Ironically, a significant threat to the cockatoo on the island is believed to come from the Komodo dragon *Varanus komodoensis*, the very species responsible for the high level of protection the park enjoys and from which the cockatoo has so evidently benefited: in their first year of life, dragons

are arboreal and feed opportunistically on such things as eggs and nestlings of hole-nesting birds, and must account for a good number of cockatoo broods (D. Agista *in litt.* 2000).

*Flores* Already a century ago much of the lowland forest of western Flores had been cleared so that “only the higher portions of the mountains are capped with the original old forest” (Hartert 1897b). This has proved not to be entirely accurate (C. Trainor *in litt.* 1999), and the decline in the 1980s is less attributable to forest loss than to farmers trapping birds as crop pests and selling them as trade items (Verhoeve and Holmes 1998); indeed, people interviewed in 1997 attributed the decline of the species to heavy trapping throughout the 1970s, coordinated by traders from Sulawesi and western Nusa Tenggara (Pilgrim *et al.* 2000). The site at Ria, Flores, is a limited production forest and is being opened up and settled (Pilgrim *et al.* 1997).

*Rinca* Birds cross from Rinca to westernmost Flores, and there they are exposed to trapping pressures (D. Agista *in litt.* 2000). Moreover, the long-tailed macaque *Macaca fascicularis* has been introduced to the island, multiplied its numbers substantially, and become a food competitor (specifically over *Tamarindus indica*) with the cockatoo (D. Agista *in litt.* 2000).

*Timor* Loss of monsoon forest has been extremely severe in West Timor, and forest loss in general has been considerable in East Timor: see the equivalent section under Wetar Ground-dove *Gallicolumba hoedtii*. In East Timor Ora (2000) identified six factors contributing to the species’s present precarious status: (a) intensive trapping in the 1970s and 1980s; (b) continued persecution for trade by the unemployed as a means of livelihood; (c) use of the species as a souvenir; (d) use of the species as a domestic status symbol; (e) habitat loss through burning and the illegal felling of large (nest) trees; (f) persecution as a pest.

*Sumba* Habitat destruction was judged to have contributed to the species’s decline (Zieren *et al.* 1990), and this seems entirely plausible given (e.g.) a 60% loss of forest cover between 1927 and around 1990 (for this and further information on forest decline on the island see the equivalent section under Sumba Hornbill *Aceros everetti*). However, the massive decline which occurred in the 1970s was compounded and perhaps driven by trade: trapping at a roost on the island was noted with the very first encounter of the species in one field trip in February 1978 (Kendall 1979), and one trapper at Tengairi was reckoned to have caught 3,000 birds in the vicinity of his village in the five years before 1990 (Riffel and Bektı 1991); illegal trade was continuing in the 1990s (M. J. Jones *et al.* 1995). This was also noted by Zieren *et al.* (1990) who, while noting that trade “appears to be controlled by the system of quotas”, found that an “illegal ‘black’ market is flourishing and no sound scientific methods are being applied to assess the sustainability of this quota management system”. In 1989 cockatoos were captured in snares or taken as young from nests, tame birds sometimes being used as decoys, and whilst on a hunting trip trappers normally then expected to catch one bird every 2–4 weeks, selling most to brokers, usually for Rp 60,000–100,000, for resale to wholesalers (Jones and Marsden undated). A maximum of just over 3,000 birds were estimated to have been supplied from Sumba in 1989, when there were probably four wholesalers on the island, each of whom would accumulate 50–150 birds (sold to exporters for Rp 150,000 each) prior to export; the birds were flown to Jakarta via Denpasar, and “a few days after their arrival in Jakarta, only one in five of the Citron-crested Cockatoos were still alive (PHPA official, pers. comm.)” (Jones and Marsden undated). The decline in the species was by then so severe that extinction was anticipated: a reduction of exports to 500 birds a year was suggested (Jones and Marsden undated). Throughout the 1990s the pressure on the island’s cockatoos has, however, continued (Kinnaird 1999), and it was recently reported that trappers from Timor had started to scale down their visits because they were becoming less economically worthwhile, although local corruption and collusion in illicit cockatoo smuggling was still rife (I. Mauro *in litt.* 1999).

*Masalembo Islands* All natural forest except mangroves has been cleared on these tiny islands, the coconut groves that now cover 70–90% of the islands’ surface having been planted

in the 1970s (Cahyadin *et al.* 1994a). Some time in the mid- to late 1980s two groups of collectors arrived on Masakambing from Bali and Ujung Pandang and caught and exported “hundreds” of cockatoos, after which the species was rarely seen, while on Masalembo the complete loss of the birds was attributed to oil exploration staff, present there 1985–1989, who took them for souvenirs or shot them for sport (Cahyadin *et al.* 1994a). From this it appears that the conversion of habitat in the 1970s was not a catastrophic event for the species, which presumably found enough food to survive in good quantities (although it is possible that reproductive output fell until the coconuts matured sufficiently to provide nest-sites), otherwise the trappers and hunters of the 1980s would not have found such numbers as they reportedly did. Cutting of kapok trees for boat materials may now be a serious threat, since the last remaining birds depend on kapoks for food and nest sites (F. Arganarata, A. Kristianto, E. Putra *in litt.* 1999).

**MEASURES TAKEN** The species was placed on CITES Appendix II in 1981 (Inskipp *et al.* 1988). It was, in 1988, unprotected by Indonesian law, but legislation had then recently come into force to require government permits for catching, owning, breeding or transporting all unprotected wildlife species (Inskipp *et al.* 1988). It is now fully protected under Indonesian law (but see Threats). Most importantly, in the course of 1998 a recovery plan for the species was developed and adopted (PHPA/LIPI/BirdLife International-IP 1998).

A few protected areas offer a small degree of security for the species. On Sulawesi it is present in Pasoso Island Wildlife Sanctuary (50 km<sup>2</sup>), Rawa Aopa Watumohai National Park and Caraenta reserve. The single known breeding pair on Buton are inside a tourist park which has been receiving increasing attention from PKA (Baltzer undated). The great majority of Pulau Moyo off Sumbawa was declared a nature reserve (*suaka margasatwa*) in August 1975 (Beudels and Liman 1981), although the protection status of the area has subsequently been changed to a recreation park (R. F. A. Grimmett *in litt.* 2000). In 1989–1990 Komodo National Park, 40,729 ha, was thought to provide the best protection for the species anywhere in its range (Bishop 1992a). This tended to be confirmed by work in 1993 and 2000, when the population appeared relatively safe owing to the fairly strong protection of the area related to sustained tourist interest in viewing the Komodo dragon (Butchart *et al.* 1996, D. Agista *in litt.* 2000). In 1997 the species was recorded in Wolo Tadho Nature Reserve (cagar alam), Flores, which was set up in 1990 and covers 4,016 ha (Pilgrim *et al.* 1997). Langgaliru was in 1992 the site of Sumba’s only protected area (M. J. Jones *et al.* 1995), but in 1998 this area was incorporated into Manupeu-Tanahdaru National Park which, together with a second, Laiwangi-Wanggameti, represent the two most important forested areas of the island (PKA/BirdLife International 1998). On Sumbawa, at Batu Hijau, the mining company PT Newmont Nusa Tenggara has established a cockatoo conservation programme which includes twice-yearly monitoring of the wild population there and protection of known nest trees inside its concession; it has expressed an interest in supporting the establishment of Selalu Legini Strict Nature Reserve (*BirdLife International Indonesia Programme Ann. Rep. 1999*, I. Setiawan and Y. Cahyadin verbally 2000).

As part of the recognised need (see Measures Proposed) for high-quality biological data, WCS-IP has instituted a programme of research on Sumba: radio-transmitters were attached to a group of confiscated birds there which were released into a forest patch at Melolo in June 1999, and data on habitat use and movements have been steadily accumulating (Kinnaird 1999, M. F. Kinnaird verbally 1999).

The conservation of two relict populations, including that of the distinctive large race *abbotti* on the Masalembo Islands, required certain actions (see Cahyadin *et al.* 1994a, Setiawan 1996). Some of these have been taken: the islanders on Masakambing are highly sensitised to their last eight birds, monitor them, and seek to help them through the provision of nestboxes, while on Penida local people have stopped harvesting chicks even without the incentive of a compensation scheme (I. Setiawan, Y. Cahyadin verbally 2000). Moreover, on

Sumbawa a cockatoo management plan has been prepared for the Batu Hijau area and recommends the establishment of Selalu Legini Strict Nature Reserve (BirdLife International Indonesia Programme Ann. Rep. 1999, I. Setiawan, Y. Cahyadin verbally 2000).

**MEASURES PROPOSED** A suite of activities incorporating many ideas and suggestions made over recent years is now in the process of being implemented through the Yellow-crested Cockatoo Recovery Plan (see PHPA/LIPI/BirdLife International-IP 1998). This breaks down into five activity areas, as follows:

(1) *Control of trade* Actions needed include enhancement of national legislation, followed by collaboration with wildlife traders' associations, national carriers, airport authorities, CITES management authorities, local NGOs and Asian NGOs, in order to strengthen the movement to impose the law and monitor the situation. Maintaining close scrutiny of the species's trade status, with a view to its possible inclusion on Appendix I of CITES if the evidence shows the need, is essential.

(2) *Conservation of key habitats* Actions needed include work by the Indonesian forestry agency to prevent nest-tree cutting, local decrees to protect nest trees, establishment of a management unit for the new parks on Sumba, implementation of the Sumba Forest Conservation Strategy (see equivalent section under Sumba Hornbill *Aceros everetti*), development of proposals for protected areas at Selalu Legini (Batu Hijau) and Tambora Utara on Sumbawa (see Jepson and Monk 1995 for these plus Kompleks Hutan Dompou, which is presumably Rensch's "Dompoe", and Gunung Olet Sangenges), appropriate expansion of reserves on Sulawesi, increased use of traditional law (adat), provision of support at Rawa Aopa Watumohai and Komodo National Parks, status determination through interview programmes, identification of Important Bird Areas in Nusa Tenggara.

(3) *Replacement of demand on wild birds* Actions needed include the establishment of captive breeding facilities, study of the use of nestboxes to increase productivity, and development of a system to manage captive and wild populations and supply market needs from such managed populations.

(4) *Advancement of knowledge of the species* Actions needed include a study of the cockatoo's basic ecology on Sumba, Masakambing, Moyo, Komodo and somewhere on Sulawesi, with a long-term programme of research into its feeding ecology, breeding success and population dynamics, with special reference to its status as a crop pest, establishment of population baselines and monitoring programmes throughout its range with individual initiatives for Sumba, Flores, Alor and Pantar, Timor and Semau, and Sulawesi.

(5) *Capacity building and awareness campaigns* Actions needed include the promotion of community awareness, dissemination of information to key individuals and institutions, training of participants, full involvement of collaborating agencies in the plan, exploration of the potential role of cockatoos in tourism.

This suite of actions covers various recommendations made in recent years (e.g. in M. J. Jones *et al.* 1995, Wardill *et al.* 1995, Mallo and Setiawan 1996, Butchart *et al.* 1996, Pilgrim *et al.* 1997). Four points may be worth stressing, however. (1) It needs to be recorded that the discovery of the Rawa Aopa Watumohai population in 1995, when the last sightings (according to park staff) had been in 1989 and the species was thought to be very rare or extinct there, demonstrates that there is no substitute for the concerted effort of *searching* for birds. (2) On Sumbawa 99% of people interviewed expressed regret at the decline of the cockatoo and at the fact that young people on the island did not know the bird (Setiawan 1996); therefore there is scope for changing local approaches to cockatoos. (3) The discovery of the importance of *Tetrameles* trees to the species indicates the value of preserving as many of them as possible in conservation areas (they are much used by other species, including Sumba Hornbill, and are so smooth-barked that they are difficult to climb) (Marsden and Jones 1997). (4) Certain small islands within the range of the species appear not (or only very cursorily) to have been visited

by any ornithologist and may prove to harbour the species, e.g. Sabalan between South Sulawesi and Sumbawa, Tanakeke off South Sulawesi, Manui and Wowoni off south-east Sulawesi, Kabaena south of south-east Sulawesi (see Remarks 10), Atauro (Kambing) between Wetar and Timor, Padar near Rinca (possibly; see Distribution), Treweg, Batang and Rusa around Pantar, Adonara (see Remarks 11) and Solor (see Remarks 12) between Flores and Lomblen, Savu (Sawu) between Roti and Sumba, and Banta between Sumbawa and Komodo. Roti and Lomblen (see Remarks 3, 4) also merit surveys.

The need for a full survey of and comprehensive conservation strategy for Timor's forests is emphasised in the equivalent section under Wetar Ground-dove, along with information on current proposals to protect Gunung Timau (Timor) and Gunung Arnau (Wetar).

**REMARKS** (1) Recent analysis indicates that, as hinted in Collar (1997b), the genetic distance between Yellow-crested and Sulphur-crested Cockatoo *Cacatua galerita* is small, and that the two might better (or should) be regarded as conspecific (I. Schliebusch and G. Schliebusch *per* R. F. A. Grimmett *in litt.* 2000). Nevertheless, owing to the considerable step down in size between these two species (although with acknowledgement of the distinctively large *C. s. abbotti*), and until such time as these recent findings have been published and their validity and implications debated, it is judged here necessary to retain *C. sulphurea* within its traditional twentieth-century species limits. (2) There is some variation between islands and areas that is not necessarily reflected by the current taxonomic arrangement. For example, Hartert (1897a) named *C. s. djampeana* (from Tanahjampea) on the basis of the smallness of the bill, and Hartert (1898c) found that birds from Flores and Lombok have "conspicuously longer, thicker, and stronger beaks than the Timor birds" and hence named them *occidentalis*. These races have not, however, been taken up. (3) Verheijen (1976) reported that birds "certainly occur on Roti" (off Timor), although he did not record them there himself in 1969. Mees (1975) reviewed Verheijen's manuscript but did not include the species for Roti. Moreover, Johnstone and Jepson (1996) made no reference to the species, even to Verheijen's report of it. (4) Given its distribution, this species ought to occur or to have occurred on Lomblen (Lembata). However, evidence only came to light in December 2000, when the village head at Puor reported that he had seen cockatoos in that area since 1988, and several other informants reported them to be almost extinct there as a consequence of trapping (for trade) and persecution (as a crop pest), with trappers from the Bima area of eastern Sumbawa, and others from Java, coming to the island in the 1980s and 1990s to capture birds; based on this information, it is guessed that probably fewer than 50 birds survive on the island (C. Trainor *in litt.* 2001). These records are here treated as provisional pending further survey of the island. (5) This is evidently the locality "Binonko" implied by Meyer (1879) to be on Buton, and from which "many specimens are brought... to Amboyna". (6) Meise (1929–1930) listed two males from "Kalao adi" in September 1927, but in his subsequent list of measurements he did not mention such a locality but rather "Kaju adi" (with wing lengths of two males). It is assumed therefore that "Kalao adi" was a slip, although the situation is complicated by the fact that he was dealing with specimens of birds also from the islands of "Kalao tua" (see records for Kalaotoa in Distribution) and "Kalao". In fact the species *was* recorded on Kalao, but only in von Plessen's diary (see Meise 1929–1930:201). (7) Beudels and Liman (1981), having listed the cockatoo for Pulau Moyo off Sumbawa, stated that the birdlife of Tombokora is "very similar to that described for Pulau Moyo" but that "the Psittaciformes are much more numerous"; they gave two examples, but since the cockatoo was numerous on Moyo they did not mention it. However, it seems likely that, if they had *not* encountered the cockatoo, they would have mentioned the fact. (8) Komodo National Park embraces the islands of Komodo, Padar and Rinca, hence the unusual locality citations for these islands; this means that, although the national park is listed in bold for Komodo and Rinca, the coordinates in the gazetteer are for the centre of each island. (9) An untraced locality on Flores is "Otoave", in or before 1937

(male in MNHN), but this name is probably a misreading of a handwritten label. (10) This was apparently the largest island in Indonesia that had never been visited by an ornithologist (J. C. Wardill *in litt.* 1999). However, it was visited for two weeks in September 2000 and no cockatoos were observed (J. Robinson-Dean *in litt.* 2000). (11) Adonara was visited very briefly, without result, by Mochtar (1989b), and by C. Trainor in December 2000, who met a priest who reported that indeed cockatoos *had* occurred on the island into the 1980s, but had been trapped out by people from Kupang at some time in that decade, with his last personal sighting in 1985; however, a local person reported that some birds are still present in the Witiama district in the north-east, behind Ile Boleng volcano, although other locals mentioned that they thought these birds might be occasional immigrants from Lomblen (C. Trainor *in litt.* 2001). (12) Although there is no direct evidence of the species from the island, “a wild guess” is that up to 10 birds may survive there (C. Trainor *in litt.* 2001).