

# The status and distribution of Spot-billed Pelican *Pelecanus philippensis* in southern India

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Surveys for Spot-billed Pelican *Pelecanus philippensis* were conducted in southern India from May 2000 to April 2004. Population estimates were based on counts of birds at nesting colonies and of large congregations at foraging sites, supplemented by published and unpublished recent records. A population of 2,850–3,700 birds is estimated for the states of Andhra Pradesh, Karnataka, Tamil Nadu and Kerala, which is higher than earlier estimates.

## INTRODUCTION

Spot-billed Pelican *Pelecanus philippensis* is one of the most threatened of the seven species of pelicans in the world. The total population is estimated to number 2,500–5,000 individuals in South Asia, 3,000–5,000 individuals in South-East Asia and <25 individuals in Sumatra (BirdLife International 2001, Wetlands International 2002). Populations are declining owing to factors such as human disturbance at the nesting grounds, hunting, loss of wetlands, pollution and over-fishing (see BirdLife International 2001 and Manakadan and Kannan 2003 for summaries). A number of anecdotal accounts, studies and survey results have been published on the species in India (e.g., Neelankantan 1949, Gee 1960, Lamba 1963, Neginhal 1977, Saxena 1980, Nagulu 1983, Nagulu and Rao 1983, Perennou and Santharam 1990, Perennou and Mundkur 1992, Johnson *et al.* 1993, Krishnan 1993, Riyazuddin 1994, Perennou *et al.* 1994, Sridhar and Chakravarthy 1995, Subramanya 1996a,b, Subramanya and Manu 1996, Manu and Jolly 2000). We undertook specific surveys for the species in the states of Andhra Pradesh, Tamil Nadu, and Karnataka in southern India. As there are few records of Spot-billed Pelican in Kerala (Ferguson and Bourdillon 1903–1904, Nameer 1993, Nair 1994, Ravindran 1995), and these probably refer to stragglers from Tamil Nadu, we did not carry out surveys in this state.

## METHODS

A base camp was established in the Pulicat Lake-Nelapattu area of Andhra Pradesh from May 2000 to April 2003, where regular censuses were carried out. During 2002–2004, surveys were carried out at other sites in southern India, mainly during the breeding season (October–April). These sites were chosen based on published localities, and information gathered from forest department personnel, birdwatchers, ornithologists, and local people. A total of 37 sites were visited during the survey, of which 14 were breeding colonies (either regular or occasional), four were former breeding colonies, and the remainder were foraging sites. Data on Karavetti-Vettakudi, Coringa, Watrup, Kaliveli-Yedayanthittu and Labaku-Reddipalle were based solely on secondary sources. Single counts were made at foraging sites, but 3–4 counts were made at each nesting colony, and the maximum number was

used in the analysis. In some cases the survey data were supplemented with secondary information obtained from forest department records, local people and birdwatchers. All counts were carried out rapidly from watchtowers, vehicles, or on foot, to reduce the chances of double counting. Counts at foraging sites were generally carried out from 07h00 to 09h00, while those at colonies were carried out between 11h00 and 14h00 when most of the adults would have returned from the foraging grounds. It was not always possible to count the number of nests owing to dense vegetation obstructing views. Juveniles were easily distinguished from adults by their brownish rather than whitish plumage. We found it difficult to differentiate sub-adults as their brownish-tinged plumage varied considerably in different light conditions, and hence we did not count them separately.

## RESULTS

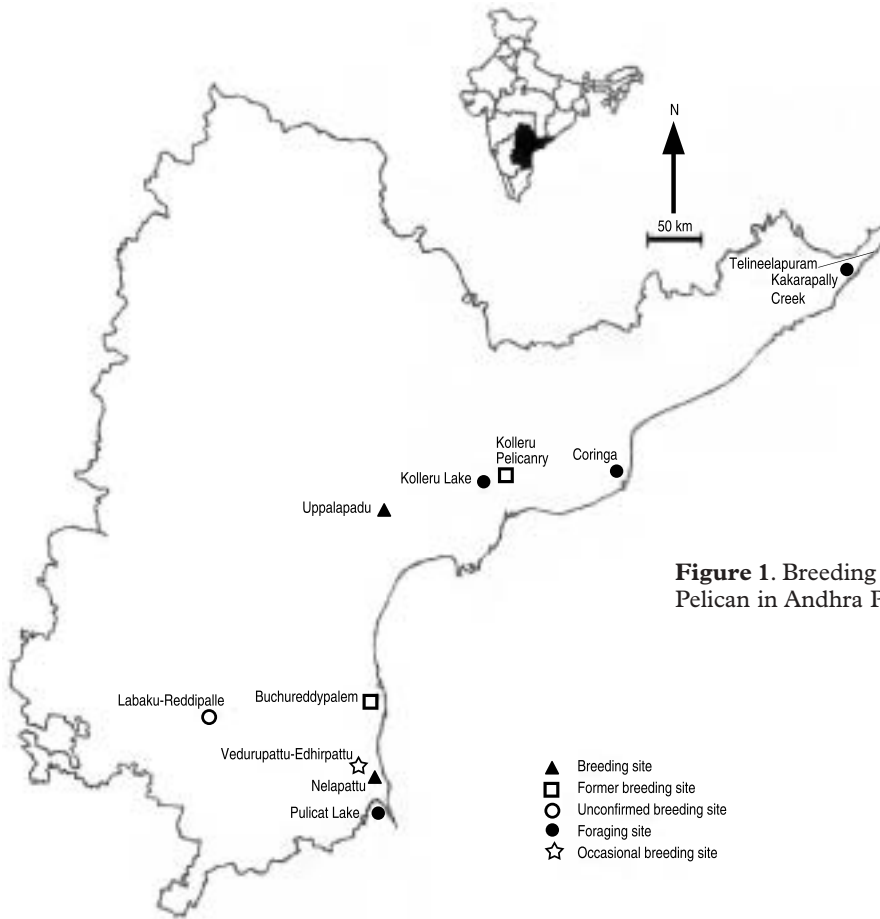
The Appendix summarises the records at each site, and sites are mapped in Figs. 1–3. From these data, we estimate the population of Spot-billed Pelican in southern India to be 2,850–3,700 individuals. There are three relatively stable large breeding colonies in Andhra Pradesh (Telineelapuram, Uppalapadu and Nelapattu) and one each in Karnataka (Kokkare-Bellur) and Tamil Nadu (Koonthakulam).

### Andhra Pradesh

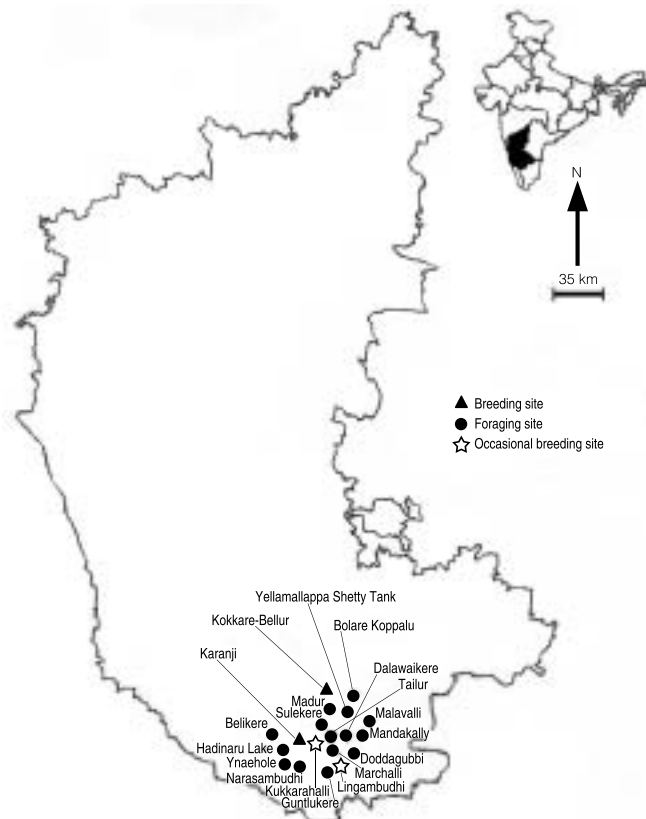
There are probably three subpopulations in Andhra Pradesh (extending into the neighbouring states of Orissa and Tamil Nadu) and numbering 850–1,200 individuals in total.

(1) At Telineelapuram, Srikakulam district, the breeding population numbers c.100 individuals. The birds forage at Kakarpally Creek (100 km<sup>2</sup>, c.10 km away), but the major foraging grounds may be at Chilka Lake, Orissa (856 km<sup>2</sup>, c.100 km away). The total population at Chilka was c.250 birds in 1993 (Balachandran *et al.* 2002) and 130 birds in 2004 (S. Balachandran verbally 2004).

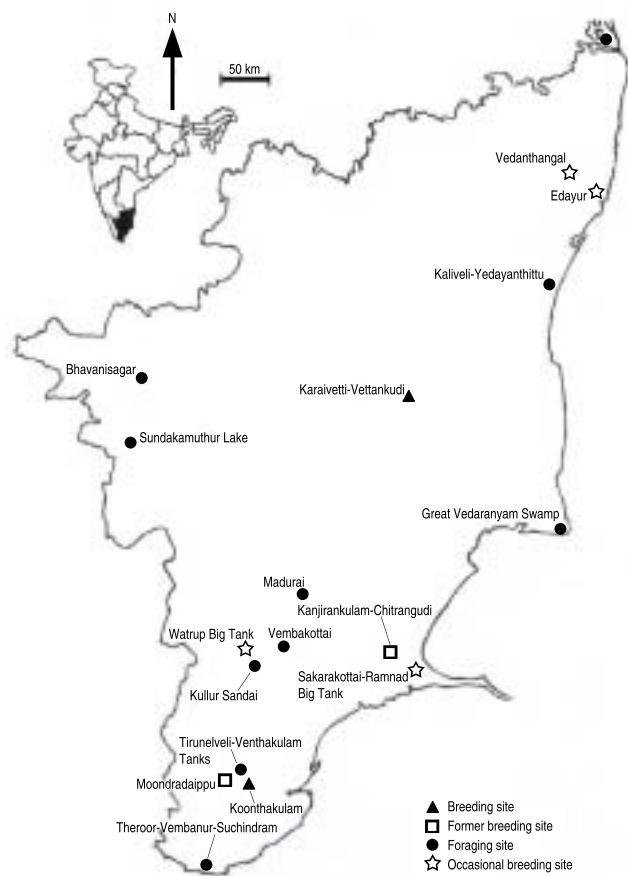
(2) Another subpopulation probably comprises the remnants of the colony at Kolleru, where both the nesting habitats (at Aredu, Sarepalle and Kolamuru) and the major foraging area at Kolleru Lake have been destroyed or are heavily disturbed. Birds from here may have been the source of a new colony established at Uppalapadu, c.75 km away, in 1999–2000. Other birds from Kolleru may be currently breeding



**Figure 1.** Breeding colonies and foraging sites for Spot-billed Pelican in Andhra Pradesh.



**Figure 2.** Breeding colonies and foraging sites for Spot-billed Pelican in Karnataka.



**Figure 3.** Breeding colonies and foraging sites for Spot-billed Pelican in Tamil Nadu.

elsewhere in the Krishna-Godavari deltas, which form the major foraging grounds. We estimate the current population in this region to be 200–300 birds, a huge decline from the estimated 3,000 birds at Kolleru in the middle of the twentieth century (Neelakantan 1949, Gee 1960, Lamba 1963).

(3) A third subpopulation, numbering 500–600 birds, breeds at Nelapattu, Nellore district, and forages at the nearby Pulicat Lake (c.460 km<sup>2</sup>), and also at numerous irrigation tanks in the district, e.g. Kanigiri Reservoir near Nellore. These birds may forage or even occasionally breed in areas such as Vedanthangal Bird Sanctuary (Chengleput district, Tamil Nadu), about 150 km to the south. They may also forage and occasionally breed at Kaliveli-Yedayanthittu (near Pondicherry), Vedurupattu-Edhirpattu (near Nelapattu), and Edayur (Kanchipuram district, Tamil Nadu).

### Karnataka

The subpopulation in Karnataka, formerly concentrated at the adjacent villages of Kokkare, Bellur and Bannali, Mandya district, has now spread to form breeding colonies at Karanji, Kukkrhalli and Lingabuddi in the adjoining district of Mysore. It is difficult to estimate the size of this subpopulation, but it probably numbers c.350–450 birds. Pelicans seen occasionally in Erode and Coimbatore districts in Tamil Nadu probably derive from this subpopulation.

### Tamil Nadu

Spot-billed Pelican is widely distributed in Tamil Nadu, making it difficult to identify subpopulations or estimate numbers, but the state probably supports 1,600–2,000 birds. The largest colony is at Koonthakulam, Tirunelveli district, with c.450 individuals, having grown from just 30 nests in 1982 (V. J. Rajan *in litt.* to BirdLife International 2001). A smaller colony formerly existed at Moondradaippu, c.60 km away, but was abandoned in the early 1980s. There are also isolated breeding records at a few sites around Koonthakulam and Moondradaippu (see Appendix), and records of 25–40 pairs at Sakarakottai and Ramnad tanks, Ramanathapuram district. All these birds probably originated from the Chitrangudi-Kanjirankulam colony, Ramanathapuram district (c.50 km from Sakarakottai and Ramnad and c.200 km from Koonthakulam), which was abandoned in the 1990s having supported c.1,000 birds formerly.

Pelicans reported from Theroor, Vembanur and Suchindram, Kanniyakumari district, presumably derive from Tirunelveli. Those reported from Madurai Tank and Virudunagar district (Vembakottai Dam, Kulur Sandai Dam and Watrup Big Tank) may derive from Ramanathapuram. However, there could be mixing between both these sources. The origin of pelicans seen during October–February in the Great Vedaranyam Swamp is uncertain (see Appendix). They may originate in Sri Lanka, which is just 50 km away, or from the Ramanathapuram population.

Since the mid-1990s, small numbers of pelican nests have been reported at Karaivetti-Vettakudi tank (Perambalur district). Counts did not exceed 42 birds until 200–450 birds were recorded from January to

June 2003 (see Appendix). The origin of this new population can only be a matter of conjecture.

## DISCUSSION

The status of the Spot-billed Pelican in southern India (and indeed in the rest of its range) is poorly known. It was previously believed to be sedentary or subject to local seasonal movements, and it was presumed not to undertake long-distance movements regularly (Ali and Ripley 1987, del Hoyo *et al.* 1992). However, we suggest that the species may travel long distances to foraging grounds and there may also be movements between colonies. Movements up to 75 km (Findholt and Anderson 1995) and 100 km (Hatzilacou 1996) from colonies to foraging areas have been reported in the American White Pelican *P. erythrorhynchos* and Great White Pelican *P. onocrotalus* respectively.

In India, populations were estimated to number c.1,000–1,500 birds in the 1980s (Nagulu 1983). However, results of the yearly Asian Waterfowl Census conducted by Wetlands International since the late 1980s have shown the species to be more abundant (Perennou and Mundkur 1992, Johnson *et al.* 1993, Mundkur and Taylor 1993, Mundkur 1994, Perennou *et al.* 1994). In 2001, 2,000–2,500 birds were estimated for southern India (BirdLife International 2001). Our surveys produced an estimate of 2,850–3,700 birds. With a recent estimate of c.3,000 birds for Assam (Choudhury 2000), the population in India totals 6,000–7,000 birds. It is unclear whether any genuine population increase has occurred, or whether censuses have become more comprehensive. Local people in India may have become more wary of hunting wildlife since the 1980s owing to improved awareness and stricter enforcement of wildlife laws. Additionally, a number of colonies have been given protection by state forest departments since the late 1980s and 1990s. However, we foresee population declines in future owing to the multitude of human-related pressures on pelicans, especially at the foraging grounds (see Manakadan and Kannan 2003).

It should be noted that our estimates are crude as they were based on very few visits to sites, conducted at different times, and also relied on secondary information. Systematic, repeated and standardised counts at both breeding and foraging sites and monitoring of marked birds (e.g. with the help of satellite tracking) are needed to determine more accurately the population, distribution and movements of the Spot-billed Pelican in southern India.

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## APPENDIX

## Spot-billed Pelican colonies and foraging sites in southern India

Site	Status	Survey counts	Secondary information	Remarks
<b>Andhra Pradesh</b>				
Telineelapuram (19°07'N 84°40'E)	B	59 birds (Dec 2002); 95 adults, 84 immatures (Dec 2003); 200 birds (Jan 2004)		May forage at Chilka Lake
Kakarapally Creek (18°28'N 84°18'E)	F	0 (Nov 2001)	36 birds (Jan 1991: Johnson <i>et al.</i> 1993)	Foraging site for pelicans from Telineelapuram; serious hunting pressures
Kolleru (Arelu, Sarepalle, Kolamuru, Kolleru Lake) (16°47'N 81°23'E)	AB, F	Kolleru Lake: 25 adults (Nov 2003); 33 adults (Jan 2004)	Arelu, Sarepalle, Kolamuru: 0 (2003–2004: Forest Department officials)	Once held 3,000 birds (Gee 1960); abandoned in 1970s (Guttikar 1978); small numbers still visit
Uppalapadu (16°16'N 80°21'E)	B	292 birds (Mar 2002); 192 adults, 152 juveniles (Dec 2003); 356 adults, 700 juveniles (Jan 2004)		Colony may have been formed by birds abandoning Kolleru
Coringa (16°59'N 80°03'E)	F	Not visited	40 birds (May 2003: Asian Waterfowl Census)	Godavari (incl. Coringa) and Krishna deltas are major foraging grounds for Uppalapadu colony
Labaku-Reddipalle (14°30'N 78°50'E)	UB	Not visited	Labaku: unspecified nos; Reddipalle three nests (Riyazuddin 1994)	
Buchureddypalem (14°29'N 80°00'E)	AB	0 (Mar 2002)	c.15 birds each winter at nearby Kanigiri Reservoir according to local people	
Pulicat Lake (13°26'N 80°20'E), Nelapattu (13°50'N 79°59'E)	F B	Pulicat Lake: 154 adults (Jan 2001); 174 adults (Nov 2002), 472 adults, 173 immature (Nov 2003); 162 adults (Mar 2004); Nelapattu: 354 adults, 534 juveniles (2001–2002), 472 adults, 379 juveniles (2002); 2–7 non-breeding adults (2003–2004)	Nelapattu: max. 1,834 birds including young (1991–2001: Sharma and Raghavaiah 2002)	Birds at Vedanthangal, Edayur and Kaliveli-Yedayanthittu probably derive from Pulicat Lake- Nelapattu
Vedurupattu-Edhirpattu (13°50'N 79°59'E)	OB	0 (Dec 2000, 2001, 2002, 2003)	Six birds, two nests (Ramakrishnan 1990); four birds (Santharam 1998)	Probably derive from Pulicat Lake-Nelapattu
<b>Karnataka</b>				
Kokkare-Bellur (12°58'N 76°44'E)	B, F	190 adults (Dec 2002); 265 adults (Dec 2003)	Birds forage at tanks in Tailur, Sulekere, Maddur, Malavalli, Bolare Koppalu, Guntlukere, Marchalli, Doddagubbi and Yellamalappa Shetty	
Karanji (12°18'N 76°39'E)	B, F	Karanji: 52 adults (Dec 2002); Mandakallykere: 30 adults Dec 2002 & 2003; Dalawaikere: 1 adult (Dec 2002); 4 adults (Dec 2003); Belikere, Narasambudhi, Ynaehole, Hadinaru, Dadadahalli: 0 (Dec 2002 & 2003)	Mandakallykere: 75 birds (Jan 2003: Asian Waterfowl Census); Belikere: 80–90 birds (Jul 1996: Rama 1996) probably derive from Kokkare-Bellur; birds forage at tanks in Dalawaikere, Mandakallykere, Belikere, Narasambudhi, Ynaehole, Hadinaru and Dadadahalli	
Kukkrahalli (c.12°10'N 76°22'E)	OB, F	0 (Dec 2002 & 2003)	>100 birds (1997: Asian Waterfowl Census)	
Lingabuddi (c.12°10'N 76°22'E)	OB, F	0 (Dec 2002 & 2003)	20–60 birds, four pairs nesting (1999–2000: K. Mohan verbally 2002)	
<b>Tamil Nadu</b>				
Koonthakulam (8°28'N 77°43'E)	B	452 adults (Jan 2003); no breeding in 2001–2002 and 2003–2004 seasons owing to drought	Ariyakulam (25 km away): 50 nests, 300 birds (early 1990s: BirdLife International 2001)	May derive from Kanjirankulam-Chitrangudi
Moondradaippu (8°40'N 77°43'E)	AB	0 (Sept 2002); 2 abandoned nests in Poolam (Jan 2003)		Moondradaippu totally abandoned; some breeding still reported at Poolam, Kalkulam, Ramalingamkulam, Poolamkulam & Kadambankulam

Tirunelveli-Venthakulam (c.8°45'N 77°43'E)	F	Venthakulam: 18 adults (Dec 2003)	Tirunelveli tank: usually 5–30 birds, but 182 adults in 2000 (S. Balachandran verbally 2003)	Derive from Koonthakulam
Theroor, Vembanur, Suchindram (c.8°04'N 77°30'E)	F	0 (Jan 2003)	1–10 birds regularly seen (1995–1997: S. Butchart <i>in litt.</i> 2004); Samithopu salt pans: 5–10 birds regularly (S. Balachandran verbally 2003)	Derive from Koonthakulam
Kanjirankulam- Chitrangudi (9°19'N 78°28'E)	AB	0 (Jan 2002 & Dec 2003)	Kanjirankulam: 115 nests (1990: BirdLife International 2001); Chitrangudi: 934 birds, 100 nests (1998: BirdLife International 2001)	Birds possibly now use Sakarakottai-Ramnad or Koonthakulam colonies
Sakarakottai-Ramnad Big Tank (c.9°22'N 78°52'E)	OB	0 (Dec 2003)	Ramnad Big Tank: 25 nests (2001–2002); Sakarakottai Tank: 40 nests (Feb 2003: S. Balachandran verbally 2003)	As above
Watrup Big Tank (09°31'N 77°31'E)	OB	Not visited	Five adults, one nest (Feb 2002: S. Balachandran verbally 2003)	Possibly a new colony
Kulur Sandai Dam (9°33'N 78°00'E)	F	1,670 adults (Sept 2002); 40 adults (Jan 2003); 4 adults (Dec 2003)		Large nos. in 2002 probably due to drought
Vembakottai Dam (9°20'N 77°46'E)	F	0 (Jan 2002, Dec 2003, Jan 2003)	157 birds (Aug–Sept, early 1990s: Sudhakaran <i>et al.</i> 1993)	Possibly derive from Sakarakottai-Ramnad and Koonthakulam
Madurai Tank (9°55'N 78°07'E)	F	0 (Jan 2003)	40 birds (Feb 1997); 150 birds (Apr 1997: Sathasivam 1997)	As above
Kaliveli-Yedayanthittu (12°10'N 79°49'E)	F	Not visited		See Pulicat Lake-Nelapattu
Great Vedaranyam Swamp (10°18'N 79°18'E)	F	3 adults (Jan 2003)	>1,200 birds (Oct 1999: Balachandran <i>et al.</i> in press); c.250 birds (2003: A. D. Barua verbally 2003)	Possibly derive from Sri Lanka
Karaivetti-Vettakudi (10°58'N 79°11'E)	B	Not visited	Nine nests (2000–2001); seven nests (2001–2002); 0 nests (2002–2003); 200–450 adults (Feb–Jun 2003: A. Relton verbally 2003); 375 birds (Jan 2003: Asian Waterfowl Census)	Source unknown
Bhavanisagar Dam (11°25'N 77°05'E)	F	0 (Dec 2002)	4 birds (Jan 1987); 14 birds (Jan 2001: Anon. 1993)	Possibly derive from Karnataka
Sundakamuthur Lake (11°15'N 77°19'E)	F	0 (Dec 2002)	22 birds (Dec 1999: BirdLife International 2001)	Possibly derive from Karnataka
Edayur (12°37'N 80°13'E)	OB	0 (Sept 2004)	No nesting during 1990s (A. Pushpanathan verbally 2004)	See Pulicat Lake-Nelapattu
Vedanhangal (12°33'N 79°52'E)	OB	0 (Oct 2002); 187 nesting birds (Nov 2003)	152 birds (Feb 1993: Venkataraman 1996)	See Pulicat Lake-Nelapattu

### Key

B = Breeding colony; OB = Occasional breeding colony; AB = Abandoned breeding colony; UB = Unconfirmed breeding colony; F = Foraging site. Recent (post-1990) records are given in the 'Secondary information' column where these exceed the numbers we recorded, or for sites we did not visit. See BirdLife International (2001) for detailed documentation of all known sites.