

## SEABIRD OBSERVATIONS IN THE SPERMONDE ARCHIPELAGO, SOUTH SULAWESI.

by

**Paul LA. Erfteimejer**

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### Summary

An overview is presented of two years (1990-1991) of scattered but Erequet seabird observations in the Spennonde Archipelago and coastal waters of Soudi Sulawesi. A total of 14 species was encountered, Overall seabird density in the area was relatively low. Traneect counts *across* the Spermoode continental shelf at the cad of the dry period (October/Nowbcr) indicated that seabird deauticc uKited with distance from the mainland of Sulawesi. The ricnest areas were *twwd* al the edge of the shelf. Tin area is probably favoured for its enhanced food availability *as* a result of upweKog. No indiealioOB were found of feabird breeding colonies in the area, but local breeding of Little Tern was recorded.

### Introduction

Recent reports on the breeding colonies of seabirds in Indonesia (De Korte 1984, 1991) have documented a serious threat to these birds, mainly as a result of the uncontrolled collection of their eggs and destruction of their breeding habitat. Much of the information on the ecology of seabirds has been collected at the birds breeding sites on land whereas only little is known about their, pelagic lives at sea (Cadee 1989). Available data on pelagic seabird distributions suggest a link with oceanograpnic processes, such as the distribution of different water masses (Joiris 1983; Ainley and Boekelheide 1983), fronts at sea (Beebe 1926; Ashmole and Ashmole 1967; Kindler *et. al* 1983; Haney and McGillivray 1985), and upwelling (Bailey 1966; Jehl 1973; Brown 1979; Abrams and Griffiths 1981). Detailed data on pelagic seabird densities and distribution from Indonesian waters are scarce (Cadee 1985, 1989; van den Berg *et at*, 1991). The present paper reports on two years (1990-1991) of frequent seabird observations in the Spennonde Archipelago and adjacent coastal waters in South Sulawesi, Indonesia. The author spent an average of three days a week at sea in the area in the framework of a PhD study on. nutrient dynamics in tropical seagrass beds (Errteimeijer 1992), which provided an excellent opportunity to study sea-birds.

### Study Area and Methods

The Spennonde Archipelago (Kepulauan Sangkarang) consists of a relatively large group of small coral islands and submerged reefa distributed over the Spermonde continental shelf, off the west coast of South Sulawesi (118°55'-119°25'E, 4°40'-5°40'S) (Fig.1). Several rivers (i.e. Jene Berang, Tallo and Maros) debouch into the sea at this location, but their impact on water quality is mainly limited to the coastal and nearshore zone (Storm 1989). The shelf water shows very low turbidity levels throughout the study area (secchi-disk readings generally over 20 m), except for

the nearshore zone, where turbidity is high as a result of terrestrial run-off and associated high phytoplankton loads. The crystal clear water and constant salinity (34-36 o/oo) are characteristic of the nutrient-poor tropical oceanic water. Areas of high productivity are concentrated in the coral reefs and seagrass beds associated with the islands, and in the coastal mangrove belt and estuaries. Upwelling of nutrient-rich water along the shelf edge during the SE monsoon has been suggested by Ilahude (1978), who repeatedly monitored water temperature, dissolved oxygen, salinity, density, nutrient concentrations and phytoplankton along the shelf edge between 1971 and 1976,

During a two year period of fieldwork in the area (January 1990 - February 1992), on average three days a week were spent at sea. All seabird observations were recorded. Most of the work concentrated on some of the islands relatively close to Ujung Pandang (up to ca. 15 km from the coast). In addition, intensive seabird counts were made during boat cruises to some off-shore islands located on the edge of the continental shelf. Four transects were sailed: from Ujung Pandang (UP) to Kapoposang (4 October 1991), from Kapoposang to UP (6 October 1991), from UP to Langkai (14 November 1991) and from Langkai to UP (16 November 1991). Distances were 31 km (UP-Langkai) and 60 km (UP.Kapoposang). Approximate sailing speed was 12-14 km/h. These transects revealed data on seabird densities across the shelf. Since observations were made while sailing, bird numbers were monitored per unit of distance, rather than per hour class at a station, such as was done by Cadee (1989). Additional seabird observations were made in coastal areas, including the estuaries of the Tallo and Maros rivers, a bay at Palanro, and fishpond areas along the west and south coast of South Sulawesi.

## Results

### **Distribution of seabird density across the shelf**

In total, 864 seabirds were counted along the four transects. Seabird abundance increased while moving from the coast towards the shelf edge in all transects, with bird numbers generally below one individual per km near the coast and up to a maximum of 32 individuals per km in the zone near the shelf edge. The transects sailed to and from Kapoposang provided much higher seabird numbers (200 and 555 birds respectively) than those to and from Langkai (80 and 29 birds), which might indicate that bird density increases towards the north-western section of the shelf. Tidal situation and seasonal circumstances were similar for all transects. Overall seabird abundance averaged 4.7 birds per km. Most birds occurred in flocks or aggregations of about 10 to 50 birds or more (c.300 birds near Tambakulu on 6 Oct. 1991) and only sporadically were observed foraging alone. These aggregations of terns, often accompanied by several frigatebirds and occasionally one or two boobies, were usually formed at sites of high fish density such as: sites of presumed upwelling (Tambakulu), schools of larger fishes or dolphins, or local fishing boats shoveling overboard some of their trash catch or fish remains. Cadee (1985) similarly observed large flocks of Bridled Tern fishing amongst shoals of tuna and in association with boobies, other terns and frigatebirds in the Banda Sea. In the present study area, the aggregations were most common in the zone near the shelf edge.

Roosting birds were observed only in low numbers on floating logs, but in larger numbers on some other occasions, ie. on the exposed reef edges of Samalona (50-80 terns) and Kudingareng Keke (30 terns) at spring low tide (on 27 November 1991) or on the intertidal sandbar at Gusung Tallang along the coast (usually up to 100 terns). A coastal survey in the area (between the deltas of the Jene Bcrang and Maros rivers) on 17 February 1990 (08.30-11.50 hr), in the framework of the Asian Waterfowl Census, revealed 460 roosting terns along *ca.* 35 km of coastline (Perennou *et al.*, 19510).

### Species accounts

A total of 14 seabird species was encountered in the study area (summarized in Table 1, with scientific names).

Brown Boobies were recorded on only six occasions at four different localities. All observations consisted of single birds. One observation of an immature bird in captivity on a small fishing boat near Kudingareng Lonapo island indicates breeding, but this bird might have been brought from elsewhere.

Frigatebirds were regularly encountered throughout the study area. Their numbers were usually low, with maximum counts of 15 birds at Laogkai (10 Sept. 1990) and 29 and 38 birds at Kudingareng Lompo (on 3 and 4 Dec. 1990 respectively). Although identification to species level is often difficult (Harrison 1993) both the Great Frigatebird and the Lesser Frigatebird could be identified occasionally (adult males). Both species are known to occur in South Sulawesi (White and Bruce 1986; C.J. Escott *in* Kukila 1990). The Great Frigatebird is known to breed in Indonesia, but there is no proof of breeding of the Lesser Frigatebird in this country (de Korte, 1984).

Phalaropes (presumed to be Red-necked Phalarope) were observed once (2 birds) on a trip from Kapoposang at about 30 km *from* the coast, floating on the water surface on 6 October 1991. Recent records confirm that Wallacean seas are an important wintering area for Rednecked Phalaropes (Kukila 1990; Bishop 1992).

One bird, observed on 6 October 1991 at 35 km from the coast, was assumed to be a skua, although identification was uncertain. The bird was chasing a tern for about 10 minutes until the tern dropped its food. Skuas observed by Cadee (1989) and Smeenk (1985) in eastern Indonesian waters were all identified as Pomarine Skua when observed at close range. In his overview, van Balen (1991) mentioned two observations of single birds of Pomarine Skua in the Makassar Strait by De Korte in May 1989. All records of skuas in Indonesian waters are from the months September-May, suggesting that they are only wintering or in transit (van Balen 1991).

Terns were by far the most common among the seabirds in the study area. Their identification to species level posed a serious problem on many occasions. The Great Crested Tern and the Lesser Crested Tern could generally be identified when at close range. They probably constituted the

major part of the undeotined tem observations at open sea. UttLe Tern was also common and recorded throughout the year. This species occurred in a wide range of habitats, including off-shore islands, open sea, intertidal flats and fishponds along the coast and even at large inland freshwater bodies such as Lake Tempe. At the intertidal sandbar Gusung Tallang, small groups of Little Terns were usually roosting at low tide, with largest numbers (40-120 birds) recorded during the months September to January (1991/92). Breeding by this species was recorded once: feeding of fledglings and defending of nests at fishponds near Maros (23 September 1990, with Peter Ames). Breeding has also been reported from Lumulumu island (August 7, 1991; David Fletcher, pers.comm.) and Kudingareng Keke island (Said, pers. comm.), but this was not confirmed during the present study. Breeding of Little Tern in Sulawesi has been previously reported (Kukila, 1990).

Gull-billed Tem was observed on several occasions in September and April. Most observations were restricted to coastal areas (mudflats, sandbars, mangroves, fishponds), bill three birds were observed foraging over the reef flat of Langkai island at low tide (11 September 1990). Whiskered Terns and White-winged Terns were common at coastal fishpond areas throughout South Sulawesi and even occurred at inland freshwater bodies like Lake Tempe (see also Baltzer 1990), but surprisingly these species were never recorded on the open sea. Their numbers varied greatly, with maximum counts of 150 birds at one site (fishponds near Maros). Common Tern could not be positively identified, but seven independent observations of individual birds at open sea and along the coast might have belonged to this species- Several unconfirmed records of this species have been reported from South Sulawesi (*Kukila* 1990). Brown Noddies were observed on at least six occasions in small groups of one to nine birds (in January, April and September). Breeding of thfe species in Indonesia has been reported (De Korte 1984, 1991).

Additional observations in November 1992 added two species to this list: Black-naped Tern: 10-15 individual birds roosting on exposed coral rhampard at Lumulumu island on 15 November 1992; Bridled Tem: at least one bird soaring over open water near Kapoposang on 15 November 1992.

## Discussion

Data gathered during this study indicate a relatively low density of seabirds in the area. Densities of seabirds were highest along the edge of the Spermonde shelf which might indicate upwelling, as proposed by Ilahude (1978). Ljpwelling processes may locally cause considerable increases in phytoplankton densities (Smith 1968; Andrews and Fumas 1986) which may attract large numbers of herbivorous fishes. Van den Berg *et al.* (1991) studied seabird distributions in the northern Indian Ocean and found that areas with high numbers of seabirds were those where high concentrations of phytoplankton were measured.

A relatively large number of 14 species was encountered in the present study, but among them were several inshore species which spend the night on land (eg. Whiskered Tern, White-winged

Tern). The area that was studied is a relatively shallow continental shelf with many coral islands in relatively close proximity to the mainland of Sulawesi. This explains why no true open ocean birds such as petrels, shearwaters and tropicbirds were observed.

There are no recent reports of breeding colonies of seabirds in the Spermonde Archipelago. Coomans de Ruiter and Maurenbrecher (1948) reported some breeding pairs of frigatebirds on Kanranrang island, but this colony has since disappeared (De Korte 1991). Except for the few breeding pairs of Little Tern, no indications were found for the presence of breeding colonies in the area during the present study. The presence of a breeding site is often a factor causing higher seabird densities (Cadee 1985).

Whereas seabirds are most seriously threatened at their breeding sites (De Korte 1984, 1991), threats in the areas of their pelagic activities may occur also, such as oil spills. Ujung Pandang is used as a major storage locality for crude oil from Eastern Indonesia and probable cases of hydrocarbon pollution have been reported (Noor *et al.*, 1987). The widespread destructive use of explosives in reef fishery by the local population (despite prohibition by law) might affect food availability for some species of seabirds (Brown 1986).

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**Address**

Netherlands Institute of Ecology, Centre for Estuarine and Coastal Ecology, Vierstraat 28, 4401 EA Yerseke, The Netherlands, and Catholic University of Nijmegen, The Netherlands.

Table 1. List of seabird species encountered in the Spermonde Archipelago during 1990-1991. Nomenclature follows Andrew (1992).

Scientific name	Common name
<i>Fregata minor</i>	Great Frigatebird
<i>Fregata ariel</i>	Lesser Frigatebird
<i>Sula leucogaster</i>	Brown Booby
<i>Stercorarius cf. pomannus</i>	Pomarine (?) Skua
<i>Chlidonias hybridus</i>	Whiskered Tern
<i>Chlidonias leucopferus</i>	White-winged Tern
<i>Gelochelidon nilotica</i>	Gull-billed Tern
<i>Sterna sumatnma</i>	Black-naped Tern
<i>Sterna anaethetus</i>	Bridled Tern
<i>Sterna albifwis</i>	Little Tern
<i>Sterna bergii</i>	Great Crested Tern
<i>Sterna bengalensis</i>	Lesser Crested Tern
<i>Anous stolidus</i>	Brown Noddy
<i>Phalaropus lobatus</i>	Red-necked Phalarope



Figure 1\* Map of the 1y area, bowing locaCiaos mentioned in the text. (dotted line is approximate edge of continental shelf).

