

## Nesting seabirds in SE Spain: distribution, numbers and trends in the province of Almería\*

MARIANO PARACUELLOS and JUAN CARLOS NEVADO

Departamento de Flora y Fauna, Consejería de Medio Ambiente (Junta de Andalucía), C. Res. Oliveros, bl. Singular,  
04071, Almería, Spain. E-mail: mparacuellos@cajamar.es

**SUMMARY:** Little is known on the abundance of seabirds breeding in southeastern Spain. This study reports on the distribution, numbers and population trends of breeding colonies of this avian group in this region. Principally from 1996 to 2000, the coast of the province of Almería was surveyed during the breeding season. In 2000, the last year of survey, we counted 1,731 seabird breeding pairs, corresponding to 8 species. The yellow-legged gull *Larus cachinnans* was the most abundant seabird with more than 50% of the total, followed by Audouin's gull *Larus audouinii*, the little tern *Sterna albifrons*, the black-headed gull *Larus ridibundus* and the common tern *Sterna hirundo*. Cory's shearwater *Calonectris diomedea*, the shag *Phalacrocorax aristotelis* and the European storm petrel *Hydrobates pelagicus* bred in small numbers. The black-headed Gull, yellow-legged gull and common tern showed increasing trends over the last decade. The most important breeding sites were Alborán Island and the sea cliffs of Cabo de Gata, La Higuera and Cabrera. A main factor influencing increasing population trends was the lack of human disturbance at legally protected breeding sites.

**Key words:** Almería province, breeding pairs, distribution, environmental factors, population trends, seabirds, southeastern Spain.

**RESUMEN:** AVES MARINAS REPRODUCTORAS DEL SE DE ESPAÑA: DISTRIBUCIÓN, CONTINGENTES Y TENDENCIAS EN LA PROVINCIA DE ALMERÍA. – Poco se sabe sobre la abundancia de aves marinas reproductoras en el sureste de España. Este estudio aporta información sobre la distribución, contingentes y tendencias poblacionales de las colonias de cría de este grupo en esta región. Principalmente desde 1996 a 2000, la costa de la provincia de Almería se prospectó durante la época reproductora. En el año 2000, nuestro último año de prospección, se contabilizaron 1,731 parejas de aves marinas reproductoras, correspondientes a 8 especies. La gaviota patiamarilla *Larus cachinnans* fue el ave marina más abundante con más del 50% del total, seguida de la gaviota de Audouin *Larus audouinii*, el charrancito común *Sterna albifrons*, la gaviota reidora *Larus ridibundus* y el charrán común *Sterna hirundo*. La pardela cenicienta *Calonectris diomedea*, el cormorán moñudo *Phalacrocorax aristotelis* y el paíño europeo *Hydrobates pelagicus* se reprodujeron en bajo número. La gaviota reidora, la gaviota patiamarilla y el charrán común mostraron tendencias alcistas durante la última década. Los lugares de cría más importantes fueron la Isla de Alborán y los acantilados del Cabo de Gata, La Higuera y Cabrera. El principal factor que afectó el incremento de algunas especies fue la falta de molestias humanas en lugares de cría legalmente protegidos.

**Palabras clave:** provincia de Almería, parejas reproductoras, distribución, factores ambientales, tendencias poblacionales, sureste de España.

### INTRODUCTION

Knowledge on distribution, numbers and trends of seabirds colonies around the Mediterranean Sea still has to be improved. This is the case of the

Almería coast in south-east Spain, where there is only partial information regarding number and trends of seabird nesting pairs (e.g., Aguilar *et al.*, 1993; de Juana, 1984; Paracuellos and Nevado, 1995; Paterson, 1997; Tasker and Reid, 1997; Tucker and Evans, 1997).

This work reports on seabird numbers and trends

\*Received August 8, 2001. Accepted September 8, 2002.

of the seabird colonies located along the coast of Almería and discusses the possible environmental factors that may have caused the observed changes.

## STUDY AREA

The study sites included five littoral wetlands: the salt pans of Guardias Viejas (36°44'N, 2°47'W), the lagoons of Punta Entinas-Sabinar (36°37'N, 2°47'W), Cañada de las Norias (36°48'N, 2°42'W), the salt pans of Cerrillos (36°44'N, 2°40'W), and the salt pans of Cabo de Gata (36°47'N, 2°14'W). Field work was also done at The Cañarete (36°52'N, 2°29'W), the marine cliffs of Cabo de Gata, La Higuera and Cabrera (36°53'N, 2°07'W), San Andrés Island (37°08'N, 1°53'W), the surroundings of the islands of Terreros and Negra (37°22'N, 1°40'W), and Alborán Island (35°55'N, 3°04'W) (Fig. 1).

The salt pans of Guardias Viejas was a shallow, saline and seasonal wetland of 150 ha, which disappeared during the period 1994-1998 because of urban development in the area. The lagoons of Punta Entinas-Sabinar (200 ha) are also shallow, salty and seasonal waterbodies. Cañada de las Norias (200 ha) is a deep, brackish and permanent water pool complex that, owing to the extraction of clay and mud for commercial purposes, presents multiple beaches and islets suitable for the breeding of waterbirds. The salt pans of Cerrillos (450 ha) is an abandoned salt pan complex of shallow, salty and seasonal waters. The salt pans of Cabo de Gata (340 ha), still with industrial activity today, have salty, shallow and permanent waters throughout the year. The Cañarete is a rocky coast some 10 km long in the mountains of Gádor, near Almería city, with vertical cliffs on all its shores. The marine cliffs of Cabo de Gata, La Higuera and Cabrera (i.e. from the lighthouse of Cabo de Gata to Carboneras) form another extensive (50 km) and abrupt coast mainly dominated by steep marine slopes, among which beaches of different width are interspersed. San Andrés Island is a rocky islet situated opposite the locality of Carboneras (0.4 km off the coast), of low relief, small size (1.2 ha) and little plant coverage. The islands of Terreros and Negra, very close to each other (1.3 km) and to the littoral cliffs of the mainland (0.7 and 0.1 km respectively), are two rocky promontories with small surface areas (1 and 0.6 ha respectively) and little vegetation cover. Finally, Alborán Island is the largest (7.1 ha) and also the least close to the

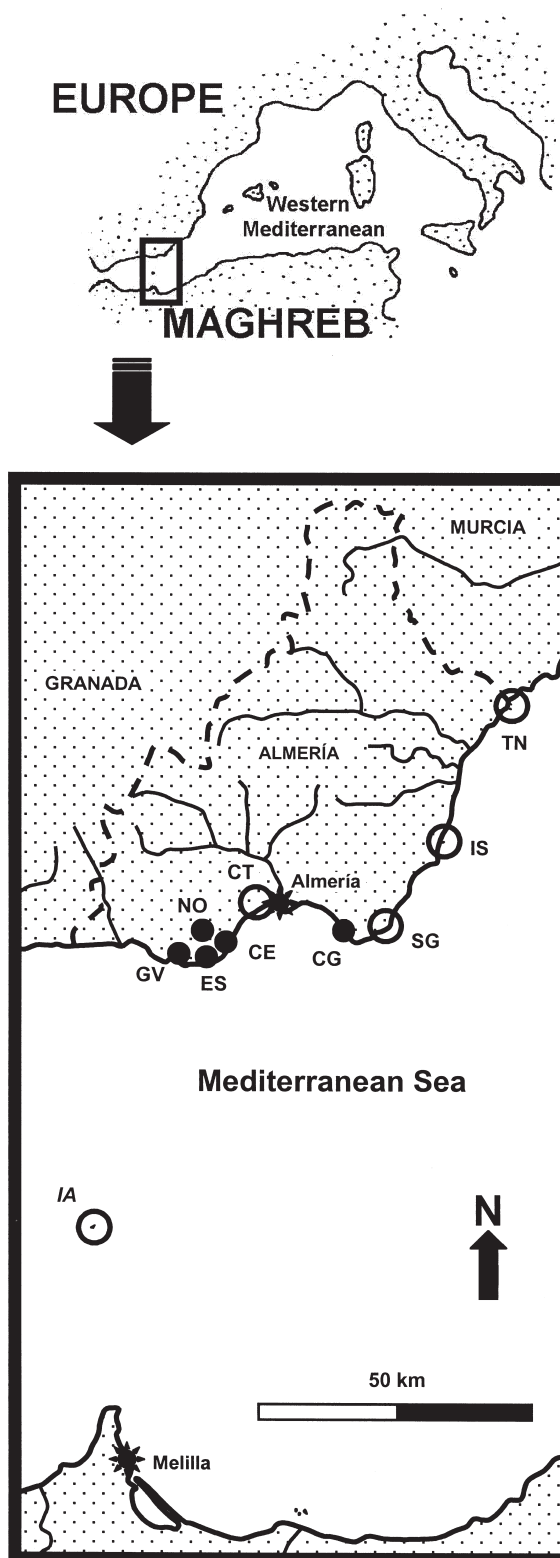


FIG. 1. – Geographical location of the study sites. Solid circles = wetlands: GV, the salt pans of Guardias Viejas; ES, the lagoons of Punta Entinas-Sabinar; NO, Cañada de las Norias; CE, the salt pans of Cerrillos; CG, the salt pans of Cabo de Gata. Open circles = marine sites: CT, The Cañarete; SG, the cliffs of Cabo de Gata, La Higuera and Cabrera; IS, San Andrés Island; TN, the surroundings of the islands of Terreros and Negra; IA, Alborán Island.

TABLE 1. – Number of seabird breeding pairs and number of species at the study sites along the coast of Almería (southern Spain) in 2000. For abbreviations of the study site names see Fig. 1.

	ES	NO	CE	CT	CG	SG	IS	TN	IA	Total
<i>Calonectris diomedea</i>	–	–	–	–	–	–	–	30	–	30
<i>Hydrobates pelagicus</i>	–	–	–	–	–	–	–	15	–	15
<i>Phalacrocorax aristotelis</i>	–	–	–	–	–	18	–	–	–	18
<i>Larus ridibundus</i>	61	33	–	–	10	–	–	–	–	104
<i>Larus audouinii</i>	–	–	–	–	–	–	–	–	170	170
<i>Larus cachinnans</i>	–	24	–	146	–	419	70	150	300	1,109
<i>Sterna hirundo</i>	4	–	28	–	80	–	–	–	–	112
<i>Sterna albifrons</i>	10	44	29	–	90	–	–	–	–	173
Total number of pairs	75	101	57	146	180	437	70	195	470	1,731
Total number of species	3	3	2	1	3	2	1	3	2	8

coast (100 km from the Iberian coast and 50 km from the Maghreb coast). It is delimited by low cliffs and shows a flat profile with sparse bushy vegetation. Some of these sites are legally protected and the others are in the process of protection (Guirado *et al.*, 1997).

## METHODS

Data collection started in 1992 but only from 1996 to 2000 a periodical monitoring of the study sites was performed. We censused annually adult seabirds and/or nests during the breeding season (Tellería, 1986). Population trends were obtained for all species except for Cory's shearwater *Calonectris diomedea*, the European storm-petrel *Hydrobates pelagicus* and the shag *Phalacrocorax aristotelis*, owing to the paucity of information.

The Spearman rank correlation coefficient was used when appropriate (Siegel and Castellan, 1988).

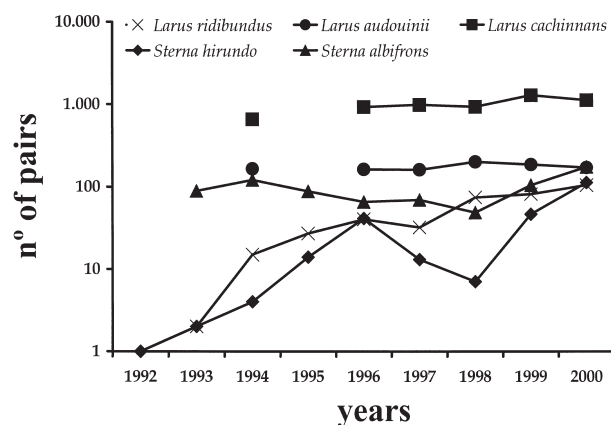


FIG. 2. – Changes in breeding seabird population numbers in the province of Almería (southern Spain). Data only for those species with ample information available for the period 1992-2000.

## RESULTS

Eight seabird species were detected as breeders in Almería during the period 1992-2000 (Table 1). Of these, the most abundant was always the yellow-legged gull *Larus cachinnans*, with an average of 1,000 pairs, approximately 71% of the total number of seabird breeding pairs per year. Audouin's gull *Larus audouinii* represented ca. 13% of the total and little tern *Sterna albifrons* 7%. The black-headed gull *Larus ridibundus*, the common tern *Sterna hirundo*, Cory's shearwater, the shag and the European storm-petrel represented the remaining 9% (Fig. 2).

We have shown in Table 1 the number of seabird breeding pairs during the breeding season of 2000. The sites with the largest number of pairs during 2000 were Alborán Island and the sea cliffs of Cabo de Gata, La Higuera and Cabrera (i.e. accounting for 50% of the total population).

The black-headed gull ( $r_s = 0.98$ ,  $P = 0.00003$ ,  $N = 8$ ), the yellow-legged gull ( $r_s = 0.89$ ,  $P = 0.02$ ,  $N = 6$ ) and the common tern ( $r_s = 0.85$ ,  $P = 0.004$ ,  $N = 9$ ) showed significant population increases during the study period (Fig. 2). Audouin's gull ( $N = 6$ ) and the little tern ( $N = 8$ ) showed no linear tendency during the study period (for both,  $r_s < 0.6$ ;  $P > 0.05$ ).

## DISCUSSION

Despite the environmental degradation along the coast of the Almería province during the 20<sup>th</sup> century, some seabird colonies of relative importance existed in this region (Paracuellos and Nevado, 1995; Paracuellos and Jerez, 2003). However, the most common species were those favoured by human activities, like the black-headed gull and yel-

low-legged gull (Aguilar *et al.*, 1993). The low degree of human presence at several study sites has also influenced their population increases.

The healthy conservation status of common and little terns was probably linked to the existence of ca. 1,000 ha of well-preserved salty wetlands in the province. The common tern was very scarce locally before the 1990s, when it colonised the zone (Aguirre *et al.*, 1995-96). Colonisation of this species was probably caused by an increase in the population on a regional scale (e.g. Díaz *et al.*, 1996) and also by the absence of human disturbance at nesting sites.

Colonies of Cory's shearwater, the European storm-petrel, Audouin's gull and the shag in Almería were the only or some of few known breeding sites for these species in the whole Andalusian territory and in the Spanish Mediterranean, hence deserving full protection (e.g. Aguilar *et al.*, 1993; Paterson, 1997; Ruiz and Rodríguez, 2001).

#### ACKNOWLEDGEMENTS

We would like to thank J.P. Enciso and E. González Miras for providing additional information, J. García, A. Rodríguez (the AMA VII crew, Junta de Andalucía) for their material support during field work, and P. Kramer and A. Paterson for the

English translation. The study was financed by the Consejería de Medio Ambiente (Junta de Andalucía, Spain).

#### REFERENCES

- Aguilar, J.S., X. Monbailliu and A.M. Paterson (eds.). – 1993. *Estatus y Conservación de Aves Marinas*. SEO/BirdLife, Madrid.
- Aguirre, A., J.C. Nevado, J.A. Oña, L. García and M. Paracuellos. – 1995-96. Colonización reciente de los humedales almerienses por aves acuáticas. *Bol. Inst. Estud. Almer.*, 14: 29-39.
- de Juana, E. – 1984. The status and conservation of seabirds in the Spanish Mediterranean. *ICBP Tech. Publ.*, 2: 347-361.
- Díaz, M., B. Asensio and J.L. Tellería. – 1996. *Aves Ibéricas. I. No Paseriformes*. J.M. Reyero Editor, Madrid.
- Guirado, J., M. Soler and R.M. Mendoza. – 1997. Planificación de los espacios naturales protegidos en la provincia de Almería. *Inv. Gest.*, 2: 141-152.
- Paracuellos, M. and J.C. Nevado. – 1995. Nidificación de láridos en la provincia de Almería (SE Ibérico). *Doñana, Act. Vert.*, 22: 102-106.
- Paracuellos, M. and D. Jerez. – 2003. Seabird communities on extreme Western Mediterranean coasts in relation to environmental conditions. *Sci. Mar.* 67(Suppl. 2): 117-123.
- Paterson, A.M. – 1997. *Las Aves Marinas de España y Portugal*. Lynx, Barcelona.
- Ruiz, A.F. and M. Rodríguez (coords.). – 2001. *Libro Rojo de los Vertebrados Amenazados de Andalucía*. Consejería de Medio Ambiente, Sevilla.
- Siegel, S. and N.J. Castellan Jr. – 1988. *Nonparametric Statistics for Behavioral Sciences* (2<sup>nd</sup> edn.). McGraw-Hill Book Company, New York.
- Tasker, M.L. and J.B. Reid. – 1997. Seabirds in the marine environment. Introduction. *ICES J. Mar. Sci.*, 54: 505-506.
- Tellería, J.L. – 1986. *Manual para el Censo de los Vertebrados Terrestres*. Raíces, Madrid.
- Tucker, G.M. and M.I. Evans (comps.). – 1997. *Habitats for Birds in Europe. A Conservation Strategy for the Wider Environment*. BirdLife Conservation Series, 6. BirdLife International, Cambridge.