DISTRIBUTION AND ABUNDANCE OF BREEDING BIRDS AT DECEPTION ISLAND, SOUTH SHETLAND ISLANDS, ANTARCTICA, FEBRUARY TO APRIL 2000

MARÍA SUSANA BÓ & SOFÍA COPELLO

Universidad Nacional de Mar del Plata, Facultad de Ciencias Exactas y Naturales, Departamento de Biología, Laboratorio de Vertebrados, Funes 3350, 7600 Mar del Plata, Argentina (msbo@mdp.edu.ar)

Received 20 September 2000, accepted 15 January 2001

SUMMARY

BÓ, M.S. & COPELLO, S. 2000. Distribution and abundance of breeding birds at Deception Island, South Shetland Islands, Antarctica, February to April 2000. *Marine Ornithology* 29: 39–42.

A survey of breeding birds during the brooding stage was carried out from February to April 2000 in the southern portion of Deception Island, South Shetland Islands, Antarctica. This island supports two Sites of Special Scientific Interest (SSSI Nos. 21 and 27). Nine species were found breeding in the study area: Chinstrap Penguin *Pygoscelis antarctica* (an estimated 6820 breeding pairs at two colonies surveyed), Pintado or Cape Petrel *Daption capense* (36), Wilson's Storm Petrel *Oceanites oceanicus* (3), Antarctic Cormorant *Phalacrocorax atriceps bransfieldensis* (9), Greater Sheathbill *Chionis alba* (2), Subantarctic Skua *Catharacta antarctica* (4), South Polar Skua *C. maccormicki* (11), Kelp Gull *Larus dominicanus* (49) and Antarctic Tern *Sterna vittata* (5). Due to the increasing tourist activity at Deception Island, better information on the location and size of breeding populations is a particular requirement if effective precautionary conservation actions are to be taken.

Key words: seabird censuses, Deception Island, Antarctica

INTRODUCTION

Populations of most seabird species in Antarctica are stable or increasing. However, there are two circumstances, activity associated with field stations (Jouventin & Weimerskirch 1991) and tourism, which are known and suspected, respectively, to have potential detrimental effects on local breeding populations (Favero & Silva 1991, Croxall *et al*. 1995, Silva *et al.* 1998). At the South Shetland Islands, particularly at Deception Island, another factor that probably affects these populations is volcanic activity. This island is a volcanic cauldron of 780 000 years, which originated through tectonic collapse of the central area of the original volcano. The volcanism, still active, displays a broad range of landforms and deposits. The most recent eruptions were in 1967, 1969 and 1970 (Smellie *et al*. 1997, Baraldo 1999).

Several localities at South Shetlands Islands have been reported as important breeding areas for seabirds (Favero & Silva 1991, Favero *et al.* 1991, Coria *et al.* 1995, Hahn *et al.* 1998). However, the literature on flying (non-penguin) seabirds especially is still scarce or very fragmented. The Chinstrap Penguin *Pygoscelis antarctica* is the species that has been most studied on Deception Island (Barbosa *et al.* 1997, Moreno *et al.* 1998). Other authors have reported information on this penguin species (Croxall & Kirkwood 1979, Woehler 1993). Adequate information on the distribution and size of seabird populations is needed to monitor change and to ensure appropriate conservation measurements. Such needs have been identified in the Protocol on Environmental Protection to the Antarctic Treaty and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) (Walton & Dingwall 1995). In this paper we detail information on the distribution and abundance of breeding birds in the southern portion of Deception Island, South Shetlands Islands, which supports two Sites of Special Scientific Interest (SSSI No. 21 including five areas, and No. 27 with two areas).

METHODS

The survey was undertaken in the southern portion of Deception Island, South Shetland Islands, Antarctica (62°58'S, 60°39'W). This island has a horseshoe form, surrounding a large bay, Foster Port (Fig. 1). The entrance to the bay, Neptune Bellows, links Foster Port with the Bransfield Strait. The diameter of the island is 13 km. The island presents a mountainous crest parallel to both coasts, with a medium height of 350 m (Smellie *et al*. 1997, Baraldo 1999). The area presents deposits of multiple and dense pyroclastic flows and surges; and deposits related to glacial, periglacial, nival, fluvial, aeolian and marine processes (Martí & Baraldo 1990, Smellie *et al.* 1997).

The survey was carried out from February to April 2000. Counts of breeding pairs during the brooding period were made with the help of 10× binoculars. The censuses were carried out by nest counts (N1), following Croxall & Kirkwood (1979), for Pintado or Cape Petrel *Daption capense*, Wilson's Storm Petrel *Oceanites*

oceanicus, Greater or Pale-faced Sheathbill *Chionis alba*, Subantarctic Skua *Catharacta antarctica*, South Polar Skua *Catharacta maccormicki* and Antarctic Tern *Sterna vittata*; by counts of total adults (A1) for Antarctic Cormorants or Shags *Phalacrocorax atriceps bransfieldensis* and Kelp Gulls *Larus dominicanus*; and by chick counts (C1) for the Chinstrap Penguin *Pygoscelis antarctica*. The numbers of Chinstrap Penguin chicks were assumed to represent the numbers of breeding pairs present at the time of the surveys.

SPECIES ACCOUNTS

Nine species were found breeding in the area of survey, namely one penguin species and eight flying bird species (Fig. 1). These species are discussed separately below.

Chinstrap Penguin *Pygoscelis antarctica*

The Chinstrap Penguin was the most abundant species breeding in the study area, with an estimated total of 6820 pairs. However, only two of the known breeding colonies on Deception Island (Croxall & Kirkwood 1979, Woehler 1993) were surveyed, one on the south-western coast and outside of the island at Vapour Col (63°00'S, 60°39'W, Fig. 1) with an estimated 6100 pairs, and the other one on the south-eastern coast at Entrance Point (63°00'S, 60°34'W, Fig. 1, 720 pairs). These two colonies are located on moraine deposits and on unconsolidated and consolidated pyroclastic deposits. The latter colony was distributed in four subcolonies named a, b, c and d, in agreement with those observed in 1967 (Croxall & Kirkwood 1979). For each subcolony we estimated totals of 300, 50, 200 and 170 breeding pairs, respectively.

At the Vapour Col colony, Croxall & Kirkwood (1979) recorded 5000 breeding pairs in 1957, and Woehler (1993) reported 10 000 pairs in 1967 and 75 000 in 1987 (all estimations performed through direct count of adults). More recent censuses carried out by Barbosa *et al.* (1997) reported 20 000 pairs for the 1994/95 breeding season. Woehler (1993) suggested that the fate and size of Chinstrap Penguin colonies at Deception Island may be greatly influenced by volcanic activity there and this may be responsible for some recorded decreases, particularly at the Vapour Col Colony.

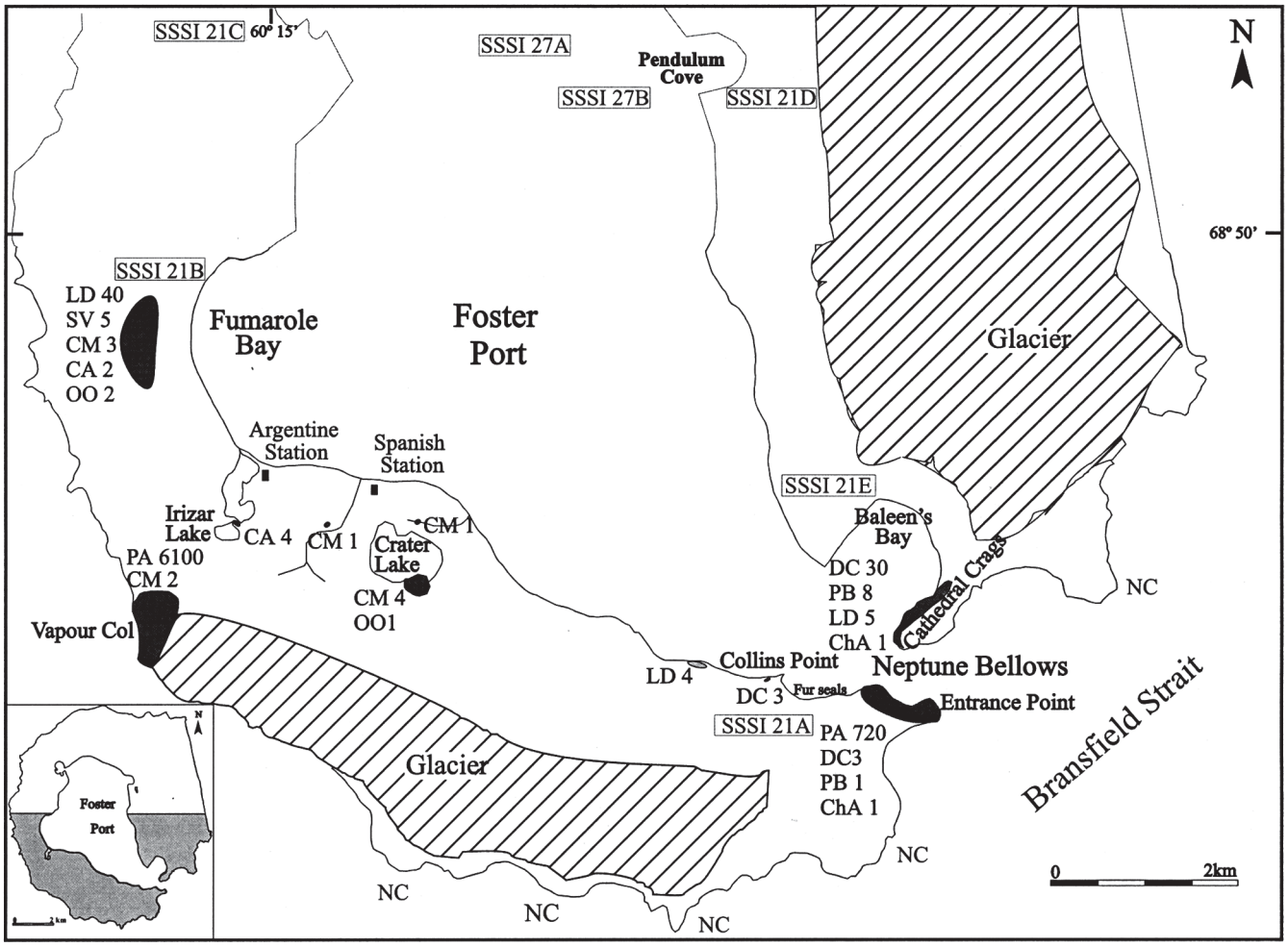

Fig. 1. *Distribution and abundance (pairs) of breeding species at Deception Island, South Shetland Islands: PA: Chinstrap Penguin, DC: Pintado Petrel, OO: Wilson's Storm Petrel, PB: Antarctic Cormorant, ChA: Greater Sheathbill, CM: South Polar Skua, CA: Subantarctic Skua, LD: Kelp Gull and SV: Antarctic Tern. In the inset the shading denotes the area surveyed. NC: seabird breeding colonies observed but not surveyed.*

A total of 150 breeding pairs of Chinstrap Penguins was reported in 1957 and 348 in 1965 at Entrance Point (Croxall & Kirkwood 1979), whereas in 1967 two different values of 450 and 2010 pairs have been given (Croxall & Kirkwood 1979, Woehler 1993). The most recent published count in 1987 revealed a total of 2000 breeding pairs (Woehler 1993).

Comparing our results with earlier censuses, we estimated fewer pairs to have bred. These differences are thought primarily due to differences in the timing of counts (since any breeding failures during incubation were not taken into account), rather than to changes in the abundance of the species over time. Previous studies have reported penguin colonies elsewhere on the outside coast of the island, including north of the region surveyed here (Croxall & Kirkwood 1979, Woehler 1993). Some of these colonies were observed in this survey (Fig. 1) but counts were not undertaken.

Pintado Petrel *Daption capense*

A total of 36 breeding pairs was observed, in three colonies. The breeding area was restricted to the Neptune Bellows area in the south-east of the island, near to the shore. Two small colonies with three nests in each were surveyed, one of them located on lava flows near to Collins Point and the other on consolidated pyroclastic deposits in Entrance Point (Fig. 1). A colony with 30 nests was recorded on Cathedral Crags on a pyroclastic outcrop, which forms a high cliff. This colony was associated with Antarctic Cormorants, Greater Sheathbills and Kelp Gulls.

Wilson's Storm Petrel *Oceanites oceanicus*

Three pairs were found breeding on the island. Two nests in Fumarole Bay, in a zone with consolidated pyroclastic deposits (yellow rocks), and one nest away from the coast, in the south sector of Crater Lake, on lava flows with scoriaceous surface (Fig. 1). Probably the total population was underestimated due to their nocturnal activity patterns.

Antarctic Cormorant *Phalacrocorax atriceps bransfieldensis*

Nine pairs were found at Neptune Bellows (Fig. 1). The nests were located on high cliffs.

Greater Sheathbill *Chionis alba*

Two pairs of this species were recorded at Neptune Bellows, one on Cathedral Crags and the other at Entrance Point (Fig. 1). The latter nest was associated with an Antarctic Cormorant colony.

South Polar Skua *Catharacta maccormicki*

Eleven breeding pairs were counted. Four were breeding solitarily and the rest were in two small colonies. One of these colonies was on the south of Crater Lake on lava flows with scoriaceous surface (four pairs) and the other on consolidated pyroclastic deposits in the north of Fumarole Bay (three pairs) close to a colony of Kelp Gulls (Fig. 1). Two solitary nests were found near a colony of Chinstrap Penguins at Vapour Col. Except for one of the pairs which had two chicks, the rest only had one.

Subantarctic Skua *C. antarctica*

Four breeding pairs of Subantarctic Skua were recorded. The nests were located on a plateau, three metres above Irizar Lake (Fig. 1). During surveys a maximum of 12 non-breeding individuals roosted near the Argentine Station, 1 de Mayo.

Kelp Gull *Larus dominicanus*

A total of 49 breeding pairs was recorded, distributed in three breeding areas inside the island. One colony, with 40 nests, was located close to Fumarole Bay, on consolidated pyroclastic deposits (yellow rocks). The second with four nests was recorded on a coastal moraine near a colony of Antarctic Fur Seals *Arctocephalus* gazella near Collins Point (Fig. 1). The third with five breeding pairs was located to the north-east of Cathedral Crags. The literature reports breeding areas of this species on the island but without details of the numbers or distribution of colonies (E.J. Woehler *in litt*.).

Antarctic Tern *Sterna vittata*

At least five breeding pairs of Antarctic Tern were present in Fumarole Bay. This breeding area was located 100 m above the colony of Kelp Gulls. Similar to Kelp Gulls, this species has been reported breeding at the island but there is no published information on their abundance or distribution (E.J. Woehler *in litt*.).

Non-breeding species

Although no nests were found, about 20 Southern Giant Petrels *Macronectes giganteus* were present in the area of the fur seal colony at Collins Point. Several Gentoo Penguins *Pygoscelis papua* were seen on the coast of the island during February and March 2000. A dead Snow Petrel *Pagodroma nivea* was found in Pendulum Cove. The species has only been previously reported by Croxall *et al*. (1995), who observed a pair on land.

DISCUSSION

At Deception Island a great number of tourists arrive during the period of November to March, averaging one tourist- or sailing ship a day. Tourists usually visit the old whaling station in Baleen's Bay and Pendulum Cove. Both areas have been classified as a Site of Special Scientific Interest (SSSI No. 21) for their volcanic activity. We consider that additional protected areas should be designated where there are important biological features, such as the seabird breeding areas at Cathedral Crags, which may be vulnerable to human impact. Due to increasing tourist activity at Deception Island, better information on the location and size of breeding populations of seabirds is a particular requirement if effective precautionary conservation actions are to be taken.

ACKNOWLEDGEMENTS

We thank Alberto Caselli for submitting data and for his assistance during the fieldwork and Marco Favero and two referees for

their assistance and comments on the manuscript. Financial and logistic support was provided by the Instituto Antártico Argentino.

REFERENCES

BARALDO, A. 1999. Evolución geológica de la isla Decepción, islas Shetland del Sur, Antártida. PhD Thesis, Buenos Aires University. 213 pp.

BARBOSA, A., MORENO, J., POTTI, J. & MERINO, S. 1997. Breeding group size, nest position and breeding success in the Chinstrap Penguin. *Polar Biology* 18: 410–414.

CORIA, N.R., FAVERO, M., SILVA, P. & CASAUX, R.J. 1995. Breeding birds at Duthoit Point, Nelson Island, South Shetland Islands, Antarctica. *Marine Ornithology* 23: 61–64.

CROXALL, J.P. & KIRKWOOD, E.D. 1979. The distribution of penguins on the Antarctic Peninsula and islands of the Scotia Sea. Cambridge: British Antarctic Survey.

CROXALL, J.P., STEELE, W.K., MCINNES, S.J. & PRINCE, P.A. 1995. Breeding distribution of the Snow Petrel *Pagodroma nivea*. *Marine Ornithology* 23: 70–100.

FAVERO, M., BELLAGAMBA, P.J. & FARENGA, M. 1991. Abundancia y distribución espacial de las poblaciones de aves de Punta Armonía y Punta Dedo, Isla Nelson, Shetland del Sur. *Rivista Italiana di Ornithologia*. 65: 85–96.

FAVERO, M. & SILVA, M.P. 1991. The status of the breeding birds at Halfmoon Island (Isla Media Luna) South Shetland Islands, Antarctica. *Contribución Instituto Antártico Argentino* 407: 1–8.

HAHN, S., PETER, H-U., QUILLFELDT, P. & REINHARDT, K. 1998. The birds of the Potter Peninsula, King George Island, South Shetland Islands, Antarctica, 1965–1998. *Marine Ornithology* 26: 1–6.

JOUVENTIN, P. & WEIMERSKIRCH, H. 1991. Changes in the population size and demography of southern seabirds: management implications. In: Perrins, C.M., Lebreton, J-D. & Hirons, G.J.M. (Eds). Bird population studies. Relevance to conservation and management. Oxford: Oxford University Press.

MARTÍ, J. & BARALDO, A. 1990. Pre-caldera pyroclastic deposits of Deception Island (South Shetland Islands). *Antarctic Science* 2: 345–352.

MORENO, J., DE LEÓN, A., FARGALLO, J.A. & MORENO, E. 1998. Breeding time, health and immune response in the Chinstrap Penguin *Pygoscelis antarctica*. *Oecología* 115: 312–319.

SILVA, M.P., FAVERO, M., CASAUX, R. & BARONI, A. 1998. The status of breeding birds at Harmony Point, Nelson Island, Antarctica in summer 1995/96. *Marine Ornithology* 26: 75–78.

SMELLIE, J.L., LÓPEZ-MARTÍNEZ, J., REY, J. & SERRANO, E. 1997. Maps of Deception Island, South Shetland Islands. In: Ricci, C.A. (Ed.). The Antarctic region: geological evolution and processes. Siena: Terra Antarctica Publications. pp. 485–493.

WALTON, D.W.H. & DINGWALL, P.R. 1995. Foreword. Determining the priorities for conservation management of Subantarctic islands. In: Dingwall, P.R. (Ed.). Progress in conservation of the Subantarctic islands. Proceedings of the SCAR/IUCN Workshop on Protection, Research and Management of Subantarctic Islands, Paimpont, France, 27–29 April 1992. Gland: World Conservation Union. pp. ix–x.

WOEHLER, E.J. 1993. The distribution and abundance of Antarctic and Subantarctic penguins. Cambridge: Scientific Committee on Antarctic Research.