Black-necked Swan *Cygnus melancoryphus* and Coscoroba Swan *Coscoroba coscoroba* in a wetland in Uruguay

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Study of the distribution and numbers of the Black-necked Swan and Coscoroba Swan shows maximum numbers in the southeast area of the country where they inhabit shallow areas of coastal lagoons; in particular Laguna de Rocha, a shallow logoon (0.58 m in medium depth) which has intermittent connections with the sea, sometimes man-made.

In this lagoon up to 7,000-10,000 Black-necked Swans and up to about 400 Coscoroba Swans were counted in some occasions.

During October 1988 to February 1989 the mouth of the Rocha lagoon was not open to the sea and its water level rose about one metre. This coincided with an exceptional drought, which caused dispersion and mortality of the swans inhabiting this lagoon and other wetlands in Uruguay. The swans dispersed among atypical areas such as dry meadows, estuaries and deep waters, the salty Rio de la Plata and even the waters of the Atlantic to 2km offshore. Due to this dispersion and mortality the number of swans in the Laguna de Rocha has decreased by more than 90% compared to the situation in 1987.

Study of the Uruguayan wetlands as a habitat for birds started when Derek Scott visited Uruguay in October 1983. From 1984 onwards these wetlands were visited more regularly by Uruguayan as well as foreign ornithologists.

Our study focussed upon the Black-necked Swan *Cygnus melancoryphus* and Coscoroba Swan *Coscoroba coscoroba* in the wetlands of the southeast Uruguay. Information is given about numbers, distribution, feeding activity and mortality of these two South American swans. Special attention is paid to the dispersal and spreading of the swans during a period of severe drought, that began about August 1988 and continues to the present (20 November 1989).

Study Area

This paper refers particularly to swan numbers in the wetlands called "Bañados del Este", which has a total area of about 300,000 hectares of lowlands in southeast Uruguay. This area extends between 33°40′ to 34°55′S and 53°30′to 54°55′W (Fig. 1). It contains seven large coastal lagoons with marginalmarshes along part of their shores.

The majority of these lagoons have intermittent connections with the sea by means of small rivulets with sand bars at their mouths, which are alternatively open or closed, sometimes by human means. Almost all have clear water, with the exception of Laguna Negra, which has much peat and silt in suspension (Secchi disc transparency from 0 to 30 cm) (Pintos *et al.* in press, a). The open water surfaces of these lagoons are more than 100 ha. Vegetation near the shores consists of emerging *Scirpus* sp., *Typha* sp., *Spartina* sp. and floating *Eichhornia* sp.

Most of the observations were made at Laguna de Rocha (Fig. 2). This lagoon is 11.5 km in maximum width by 13.8 km in maximum length, with a mean depth of 0.58 m and a maximum depth (with bar open) of 1.40 m (Pintos *et al.* in press, b). It has an intermittent connection with the sea through channels across the sand bar between the lagoon and the sea. This sand bar, when closed, completely isolates the lagoon from the sea.

The vegetation of the northern parts of Laguna de Rocha consists of *Eichhornia azurea, Pontederia cordata, Echinodorus* sp., *Ludwigia peploides, Scirpus californicus, Typha latifolia* and *Spartina montevidensis* (Pintos *et al.* in press, b). On the bottom, a sparse vegetation of *Potamogeton (Coleogeton)* sp. (E. Marchesi pers. comm.) is found.

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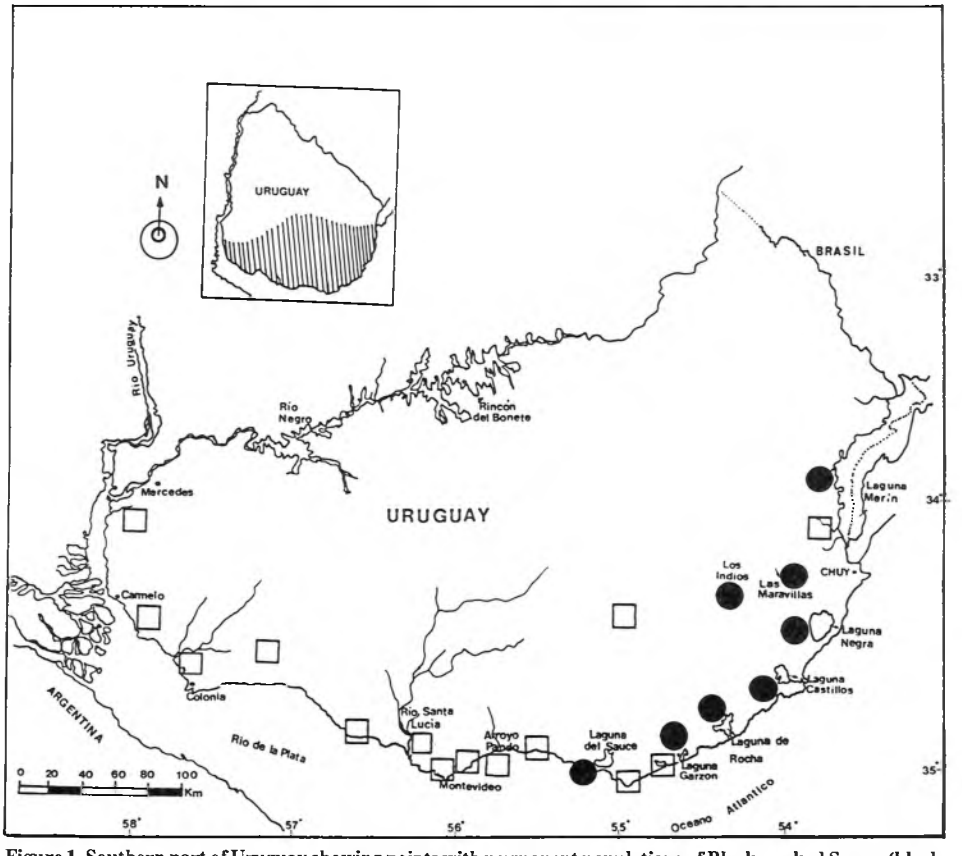

Figure 1. Southern part of Uruguay showing points with permanent populations of Black-necked Swans (black circles) and points where they appeared in considerable numbers after August 1988 (squares). Laguna Merim is about 330,000 ha of which about 100,000 ha are in Uruguay; L. Negra has about 17,600 ha (including the marshes of Santa Teresa); L. Castillos is about 10,000 ha; L. Rocha is about 7200 ha; L. Garzon is 1300 ha; L. Jose Ignacio has 1800 ha and L. Sauce is about 4500 ha. Positions are also given for Banado Los Indios and Banado Las Maravillas, which includes La Salina.

Algae of the genera *Aphanotece, Rhyzoclonium* and *Enteromorpha* (Pintos *et al.* in press, b) predominate in the southern parts. Salinity varies between 0.5 and 30‰ in the northern area, and between 5 and 30‰ in the areas near the sand bar. Mean temperatures are 7°C (June) and 25°C (January).

The low depth of Laguna de Rocha, the abundance of algae and other vegetation and, indirectly, its periodical connection with the sea, probably favours fish, mollusca and crustacea and their larvae, making this lagoon an excellent feeding place for waterfowl.

La Salina, in the Bañado de Las Maravillas, and the marsh of Los Indios, both shallow marshes with abundant emergent vegetation and areas of open water, were also studied. The first is an artificial area built about 1951 with the aim of obtaining salt by pumping sea water, which was abandoned later. It was a very important wetland for aquatic birds the whole year round from 1965 to 1988, now much reduced in summer because of its water being pumped out.

Methods

The present study presents the available data on Black-necked and Coscoroba Swans obtained in 85 visits made by one to five ornithologists to the southeast areas of Uruguay during periods from one to five days each, from 1984 to 1989.

Two censuses include the total surface of most of the mentioned lagoons. These were made from a plane flying at 30-50 m altitude, from which counts, photographs and video recordings were made. The first was made by Morrison *et al.* (of the Canadian Wildlife

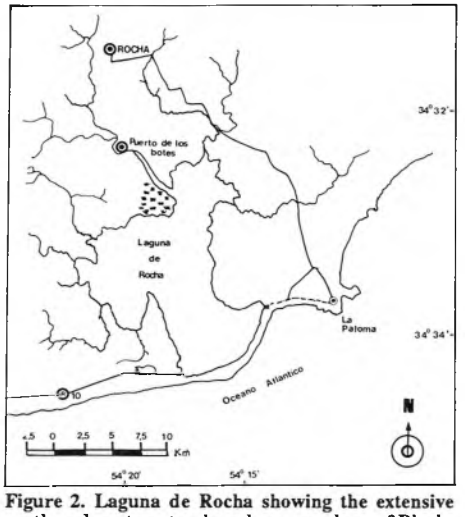

Figure 2. Laguna de Rocha showing the extensive south and west parts where large numbers of Black-necked and Coscoroba Swans feed.

Service) on 24 and 25 January 1986 (Morrison *et al.* 1989, and pers. comm.). The second census was made by Cravino and Gambarotta of the Ministerio de Ganaderia, Agricultura y Pesca of Uruguay.

Three censuses of the whole Laguna de Rocha were made on 1 August 1989, 17 October 1989 and 19 November 1989 from a boat going through the lagoon.

Most counts were made from the shores and covered either the partial or total surface of the lagoons 8 X 40 binoculars and a X 200 telescope were used. Whenever possible the counting was repeated by a second observer. During the shore observations, age and activities of the swans were recorded.

In the majority of the lagoons, no regular seasonal monitoring was possible, but several partial or total counts were made. In the particular case of La Salina of Bañado Las Maravillas, repeated counts for two years were made (Fig. 3).

During the period of severe drought (1988-89) members of the Grupo Uruguayo Para el Estudio y Conservación de las Aves observed the dispersal of the swans in the southeast, and also in the south, southwest, northwest and central regions of Uruguay.

Results

Swan population of the Bañados del Este

The numbers of Black-necked and Coscoroba Swans, counted in the two aerial censuses are given in Tables 1 and 2.

Laguna de Rocha

The aerial censuses revealed that the highest numbers of Black-necked and Coscoroba Swans were found in this lagoon, partial counts from the shore confirmed these results.

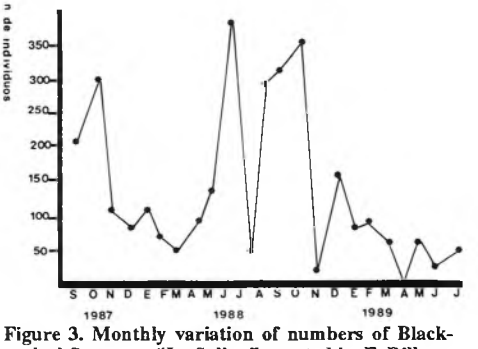

Figure 3. Monthly variation of numbers of Black-necked Swans on "La Salina" counted by F. Rilla.

From August 1988, numbers fell and there was increased mortality of Black-necked Swans in this lagoon. This coincided with both a severe drought, and an unusually long period in which the opening to the sea remained closed by the

Table 1. Numbers of Black-necked and Coscoroba Swans, counted in two aerial censuses: A: Morrison *et al.* 24-25 January 1986 (pers. comm.); B: Cravino & Gambarotta 6 October 1986 (pers. comm.)

		Lagoon or marsh										
		Merin	Maravillas	Negra	Negra marshes	Castillos	Rocha	Garzon	J. Ignacio	Maldonado	Sauce	Totals
A	Coscoroba	42	11	0		98	182	128	54	5	0	520
	Black-necked			0	76	1442	7066	151	57		77	8869
B	Coscoroba			0	2	40	249	10	14		0	315
	Black-necked	0	350	1		866	3825	1308	470		0	6820

Table 2. Numbers of Black-necked and Coscoroba Swans counted in ground censuses in various areas of Bañados del Este.

Lagoon or marsh	Number of counts	Part of area counted	Number of Black-necked Swans	Number of Coscoroba Swans
L. Merim	5	Partial	Min. 0 Max. 30	Min. 0 Max. 42
Marsh Las Maravillas	24	Partial	Min. 0 Max. 370	Min. 0 Max. 0
L. Negra	17	Partial	Min. 0 Max. 10	Min. 0 Max. 10
Marsh Los Indios	15	Total	Min. 85 Max. 442	Min. 0 Max. 17
L. Castillos	5	Partial	Min. 50 Max. 300	Min. 0 Max. 20
L. Rocha	20	Total or Partial	Min. 80 Max. 10,000	Min. 21 Max. 400
L. Garzón	3	Total	Min. 0 Max. 111	Min. 0 Max. 14
L. José Ignacio	1	Partial	0	0
L. Sauce	2	Partial	Min. 0 Max. 50	0 0

sand bar (from 12 October 1988 to 14 August 1989), causing a rise of about one metre above the normal medium depth of the lagoon (0.58 m) and a change in the normal salinity of the water of the southern area of the lagoon, which became fresh water, of salinity near 0 (normally from 5 to 30‰).

Since August 1988 to the present (20 November 1989), the numbers of Black-necked Swans in this lagoon has been dramatically reduced. A complete census performed from a motor boat on 1 August 1989 revealed no Black-necked Swans on the lagoon itself and 470 distributed between one affluent rivulet (Arroyo Rocha) and neighbouring marshes. During a total census on 17 October 1989, only 163 Black-necked Swans and 127 Coscoroba Swans were counted. During the total census on 19 November 1989, 95 Black-necked Swans and 282 Coscoroba Swans were seen.

Observations on feeding

Most Black-necked Swans observed on water were seen immersing head and neck periodically (Fig. 4). Surface feeding, dipping only the bill, or sometimes also the head, in the water, was observed on open areas with abundant floating vegetation. Occasionally upending was observed. Feeding on land was observed during the period of drought in the proximity of Laguna de Rocha. Here about 10 individuals stayed on

Figure 4. Black-necked and Coscoroba Swans feeding on Laguna de Rocha (photo Gambarotta).

Figure 5. Black-necked Swans feeding on a meadow.

Figure 6. Black-necked Swans surface-feeding on a small lagoon.

a meadow, feeding on grass, for about one month (Fig. 5). Feeding on algae covering rocks was observed on the coast of the Rio de la Plata (E. Heide pers. obs.).

The Coscoroba Swans were either observed feeding on water or, very often, resting in flocks or feeding on the sands of the shore.

Until July 1988 Black-necked and Coscoroba Swans were regularly observed feeding. However, during the period of drought they either made only a few attempts to feed in deep, fresh or salt water, or swam around without even attempting to eat. Accordingly, the condition of the swans was good until July 1988, whereas they looked very lean afterwards.

Age of individuals and nesting

Almost all the Black-necked Swans observed throughout the surveys were adults. There are only two observations of juvenile birds: one of a group of less than 10 immatures (Laguna de Rocha, E. Arballo pers. comm.), and one of parents with cygnets (Laguna Negra, J.C. Gambarotta pers. comm.). Coscoroba cygnets were observed more often (about 15 times in different lagoons).

On 11 October 1987, one Black-necked Swan nest was found in a small lagoon near Laguna de Rocha (E. Arballo & J.C. Gambarotta pers. comm.). The nest was in a reedbed, had a depth of 0.3 m and a diameter of 1 m, and contained four eggs. On 3 August 1988, three abandoned nests were found on the shores of the Pando creek (Z. Storey pers. comm.). They were about 0.3 m in height and 1 m in diameter. They were separated by distances of about 15 m, and contained only broken pieces of egg-shells.

Dispersion and mortality of Black-necked and Coscoroba Swans in 1988-89

During the period of drought and the increase in water level in Laguna de Rocha, swans were seen in many new localities or in areas where only in very small numbers had been seen before (Fig. 1).

Some swans were seen in the interior of Uruguay, such as Villa Serrana, in the Department of Lavalleja.

Swans were also seen in salty water, swimming in a flock near Costa Azul, Dept. of Canelones; they were near the shore every day from 26 December 1988 to 23 January 1989, in numbers of 12 to 59. They left the beach every evening and were seen again the following morning (J. Bianco pers. comm.). Seventy Black-necked Swans were seen in salt-water beaches of Punta del Este during December 1988 (E. Bolz pers. comm.). A few were also seen in the Atlantic, up to 2 km offshore. Observations of swans in flight increased at this time: 810 swans were recorded flying from west to east, over Fortin de Santa Rosa (Dept. of Canelones) from July 1988 to April 1989 (E. Heide pers. comm.). They passed in 70 separate flights of one to 50 individuals, lone birds or groups of up to 10 being the most frequent.

No mortality was recorded from 1984 to 1987. During the recent drought, records of mortality were numerous. On the shore of the Rocha Lagoon 87 dead Black-necked Swans were found on 25 February 1988, and 25 on 8 April 1989. On 29 July 1989 we saw seven dead Black-necked and five dead Coscoroba Swans in marginal ponds of the same lagoon. Another 140 dead Black-necked Swans were found on the salty water edge of the Rio de la Plata, near the mouth of the Pando Creek (Z. Storey pers. comm.). Mortality of swans was also recorded in many areas newly occupied during the drought. Swans seen outside their normal habitats were very lean and weak; a similar condition was observed in the population that remained at the Laguna de Rocha during the same period.

Discussion

The number of Black-necked Swans in southeast Uruguay is estimated to be over10,000. The majority of these birds was observed in Laguna de Rocha.

Counts in the same sites showed marked differences at different dates, but no regular seasonal changes were found. This suggests that the majority of the population does not regularly migrate.

Breeding of the Black-necked Swan in Uruguay has been confirmed (Casares 1944, Larranaga 1983). However, low numbers of immatures in the Uruguayan populations and the infrequent finding of nests or cygnets suggests that part of the Black-necked Swan population particularly those of Laguna de Rocha, breeds somewhere else, either in Uruguay or in other countries.

Coscoroba Swans number about 500 in southeast Uruguay and live in close proximity to the Black-necked Swan and breed actively in Uruguay.

Abandonment of the usual habitats by Black-necked and to a lesser extent Coscoroba Swans, was observed following either the drying up of the area (Las Maravillas) or increase in water level (Laguna de Rocha).

From August 1988 to at least November 1989, some areas situated in the southeast, south, southwest and centre of Uruguay, had a large increase in Black-necked and Coscoroba Swan numbers. A large number were seen flying at daytime from west to east, which suggests that Argentina may be a possible origin of extra numbers which settle in Uruguay.

Despite our study there is still an evident lack of information regarding the structure of swan populations, the existence of true migration performed by part of the population, areas of breeding, seasonal and local population changes, food and mortality. An adequate knowledge of these factors could only be obtained by regular and complete censuses and permanent tagging programmes. Therefore it is necessary that research work on the Uruguayan population of swans is encouraged and supported by international institutions of conservation.

About 20 persons, mostly members of the Grupo Uruguayo para el Estudio y Conservación de las Aves, watched events in the southeast, and also in the south, southwest, northwest and central regions of Uruguay.

Principal contributors of data on the regular status and on previous dispersion of the swans have been: Mr A. Gepp, Dr J. Cravino, Lic. G. Skuk, Lic. J.C. Rudolf, Lic. R. Sommaruga, Lic. R. de Leon, Lic. M.J. Cardezo, Lic. A. Jorcin, Mr J. Gambarotta, Mr E. Arballo, Lic. J. Bianco, Mr E. Bolz, Mrs Z. Storey, Ing. E. Heide, Miss M. Devessa, Ing. Agr. R. Praderi, Lic. M. Huertas and Dr L. Doño. Some leading foreign ornithologists have also visited the wetlands of the east of Uruguay and gave important data to us. They were Dr R.I.G. Morrison, Dr R.K. Ross, Dr D. Scott, Dr G. Matthews and Dr M. Carbonell.

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