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# Penguin Conservation

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| <b>In this issue</b> |
|----------------------|

|   |    |
|---|----|
| From the Editor   | 1  |
| Banking bird DNA: easy and worthwhile                         | 2  |
| Effects of El Niño 1997-98 on Humboldts in Peru               | 5  |
| Penguins of South America and the Falkland Islands            | 8  |
| Ecology and conservation of penguins in Chile:<br>a symposium | 16 |
| Eye on El Niño  | 25 |

# The Penguins of South America and the Falkland Islands

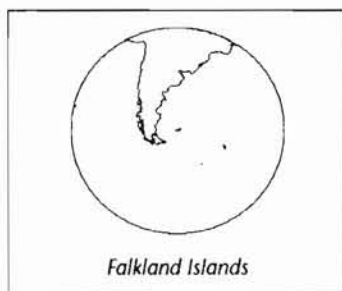
MIKE BINGHAM

## Introduction to the Region

World-wide there are 17 species of penguin, of which 7 regularly breed around South America and the Falkland Islands. Three of these species are of the Genus *Spheniscus*, and are found nowhere else in the world. These are the Magellanic Penguin (*Spheniscus magellanicus*) common around southern South America and the Falkland Islands, the Humboldt Penguin (*Spheniscus humboldti*) restricted to the Pacific coast of Chile and Peru, and the Galapagos Penguin (*Spheniscus mendiculus*) found only at the Galapagos Islands off the coast of Ecuador.

The King Penguin (*Aptenodytes patagonicus*) has a limited presence in the region, with a breeding population of around 400 pairs in the Falkland Islands (Bingham 1996). King Penguins have not bred in South America since the colony on Islas de los Estados was wiped out by sealers during the last century. The Falkland Islands hold around 20% of the world population of Gentoo Penguin (*Pygoscelis papua*), with a total population of 65,000 breeding pairs at 81 sites (Bingham 1996).

The Falkland Islands and South America are home to two species of the Genus *Eudyptes*; the Southern Rockhopper (*Eudyptes chrysocome chrysocome*) and the Macaroni (*Eudyptes chrysolophus*). The Southern Rockhopper is a subspecies that is restricted to the Falkland Islands and South America, with the Falkland Islands holding a breeding population of about 300,000 pairs at 36 sites (Bingham 1996). The Falkland Islands population of Macaroni Penguins is very small, with no colonies and only individual pairs



found breeding amongst Rockhopper colonies. The total Falklands population stands at no more than about 50 pairs.

## The Census

By comparison to other areas of research, conducting counts of breeding populations can seem fairly mundane. Nevertheless the value of data obtained from population censuses should never be underestimated. It is only by recording population size and distribution that we are able to determine with any accuracy whether a population is thriving or declining, or how a population has been affected by disasters such as an oil spill or El Niño.

During 1995/96, a population census of all penguin species (except the Magellanic Penguin) was conducted around the Falkland Islands (Bingham 1996). Every breeding colony was visited, and population totals for each species obtained. Comparing this data with previous studies revealed that the Southern Rockhopper population had crashed to a fraction of its former size (Bennett 1933, Bingham 1994c, Bingham 1995a, Bingham 1996). With no obvious reason for this dramatic decline, apart from speculation about commercial fishing, it became a priority to census the remainder of the world population located in South America, to determine how wide-spread the decline had been.

It had been shown during the 1995/96 census of the Falkland Islands, that it requires little extra effort to census all penguin species during the course of such a census. The only exception to this was the Magellanic Penguin. Its widespread, low-density distribution in burrows made it impossible to

census with methods employed for surface nesting species. For this reason the Magellanic Penguin had been excluded from the Falkland Islands census.

On that basis it was decided that a census would be conducted of all South American penguins during the 1996/97 breeding season, except for those of the Genus *Spheniscus*. In theory this meant that all species covered by the Falkland Islands census would be included, although King and Gentoo Penguins were not expected to be encountered during the South American census.

During the 1995/96 Falkland Islands census it had been possible to conduct ground counts of incubating pairs at each of the breeding colonies, because most colonies were relatively accessible (Bingham 1996). By contrast, many of the South American colonies are remote and inaccessible, and any attempt to conduct ground counts of each and every colony would have been doomed to failure. It was therefore decided from the outset that the census would be conducted by light aircraft, thereby negating the need to get ashore at difficult and remote sites.

The location of all the Falkland breeding sites had been known prior to the commencement of the 1995/96 census (Bingham 1996), but this was certainly not the case for South America. Although data did exist for a number of known breeding sites around South America, it was likely that other sites existed that had not been recorded. This was another reason for favouring an aerial census, since it provided the opportunity to cover large areas of suitable coastline in search of previously unrecorded colonies. This certainly reduced the margin of error that would otherwise have resulted from new sites being overlooked, however the margin

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of error for the actual counts was clearly greater for aerial counts than for ground counts.

In order to quantify the margin of error likely to be expected from aerial counts, a number of aerial censuses were made of Rockhopper colonies in the Falkland Islands for which the number of breeding pairs was also determined by ground counts. These aerial counts differed by a maximum of 14% from ground counts made of the same colony, giving a total margin of error of +/- 20% for aerial census data (Bingham 1996).

The 1996/97 aerial census was conducted throughout the known *Eudyptes* breeding ranges of Chile and Tierra del Fuego. The Atlantic coast of mainland Argentina was excluded from the census, since this coastline has been well studied, and does not hold any breeding sites for species covered by the census, other than a very small Rockhopper colony on Isla Pingüino,

near Puerto Deseado. This colony is regularly monitored as part of an ongoing research programme, and population data from their research was used in favour of duplicating results (Frere et al. 1993).

## CENSUS RESULTS

### King penguin

As expected, no King Penguins were recorded anywhere in South America.

### Gentoo penguin

Somewhat surprisingly, a very small Gentoo breeding colony was discovered on Islas de los Estados, containing almost 100 breeding pairs. This was the only breeding colony of Gentoo Penguin recorded in South America.

### Southern Rockhopper

The 1996/97 census showed that South America holds a breeding population of about 175,000 pairs of Southern Rockhoppers, at a total of 15

breeding sites (Figure 1 & Table 1). Apart from the very small colony near Puerto Deseado (Frere et al. 1993), these breeding sites are restricted to the islands off Tierra del Fuego and Chile. Combined with the Falkland Islands population of 300,000 pairs at 36 sites (Bingham 1996), this gives a world population of 475,000 breeding pairs at 51 sites for the subspecies *Eudyptes c. chrysocome*. (South Georgia has been known to hold a few breeding pairs, but no more than 10 pairs have been recorded).

### Macaroni penguin

The 1996/97 census found that South America holds a breeding population of about 12,000 pairs of Macaroni, at a total of 9 sites (Figure 2 & Table 2). These sites are all restricted to the islands off Tierra del Fuego and Chile. Only the islands of Diego Ramirez, Ildefonso and Noir hold more than a thousand breeding pairs.

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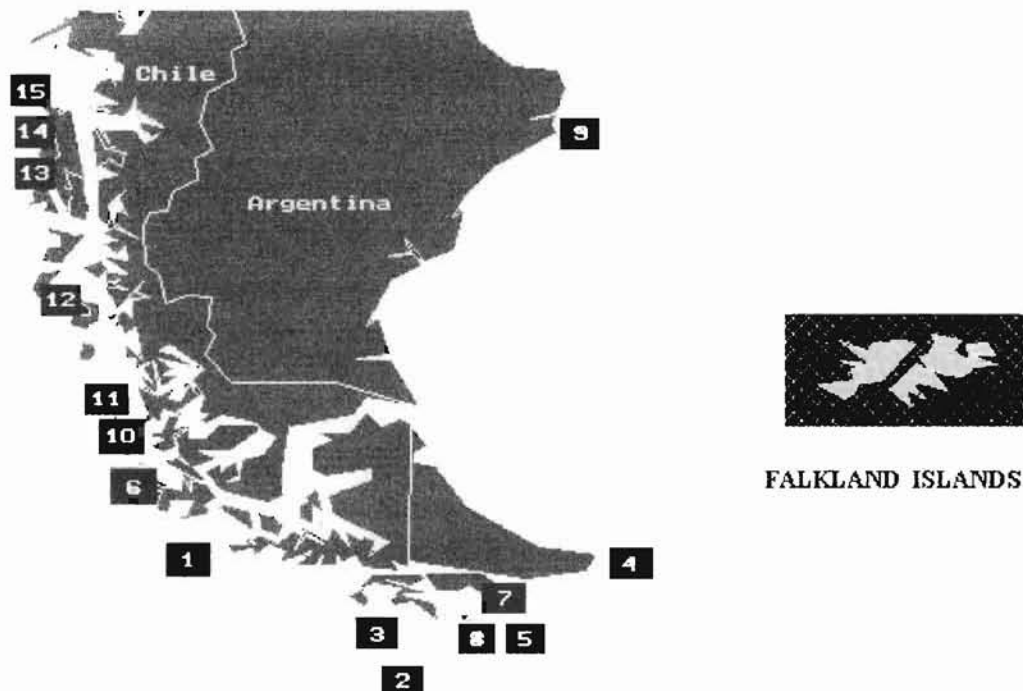


Figure 1: Map of South American Rockhopper breeding sites.

# The Penguins of South America and the Falkland Islands

*continued from page 9*

## DISCUSSION

No breeding King Penguins were observed in South America during the 1996/97 census. The Falkland Islands population stood at around 400 breeding pairs during the 1995/96 census (Bingham 1996), and has rapidly expanded from a population of less than 100 pairs recorded during 1980/81 (Bingham 1995a). With a world population of around 1,500,000 pairs (Croxall, in press), the Falkland Islands population is of regional rather than global importance.

A colony of a little under 100 breeding pairs of Gentoo Penguins was discovered on Islas de los Estados during the 1996/97 census. The Falkland Islands population stood at 65,000 breeding pairs during the 1995/96 census (Bingham 1996) out of an estimated world population of 320,000 pairs (Croxall, In press). The 1995/96 Falkland Islands census indicated a population decline of around 45% since a similar census conducted during 1932/33 (Bennett 1933).

Annual counts of selected breeding sites around the Falkland Islands suggested that much of this decline had occurred during the late 1980s and early

1990s, with low breeding success also being observed during that period (Bingham 1994a, Bingham 1994d, Bingham 1995a). Continued monitoring of these sites since then indicates that the Falkland Islands population has now risen to around 81,000 breeding pairs (Figure 3), with high breeding success rates having been recorded since 1993/94 (Figure 4). Gentoo populations are known to fluctuate greatly, and it is plausible that the decline observed previously was merely part of a natural cycle.

The world population of Southern Rockhopper Penguins now stands at around 475,000 breeding pairs, with 63% of the population in the Falkland Islands and 37% in South America.

Comparison with previous census data (Bennett 1933) indicates that the Falkland Islands population has crashed to just 10% of its former size, with much of this decline having

**TABLE 1**  
**SOUTH AMERICAN ROCKHOPPER COUNTS**  
**1996/97**

| Site #                      | Site Name              | Nests          |
|-----------------------------|------------------------|----------------|
| 1                           | Isla Noir              | 70,000         |
| 2                           | Islas Diego Ramirez    | 60,000         |
| 3                           | Islas Ildefonso        | 10,000         |
| 4                           | Islas de los Estados   | 10,000         |
| 5                           | Islas Barnevelt        | 7,000          |
| 6                           | Isla Recalada          | 5,500          |
| 7                           | Islas Terhalten        | 4,500          |
| 8                           | Grupo Cabo de Hornos   | 2,600          |
| 9                           | Isla Pingüino          | 200*           |
| 10                          | Estrecho de Magallanes | <1000          |
| 11                          | Islas Reina Adelaida   | <1000          |
| 12                          | Bahia Salvación        | <1000          |
| 13                          | Golfo Ladrillero       | <1000          |
| 14                          | Bahía Dineley          | <1000          |
| 15                          | Golfo de Penas         | <1000          |
| <b>South American Total</b> |                        | <b>175,000</b> |

(\*data from Frere et al.)

**TABLE 2**  
**MACARONI PENGUIN COUNTS**  
**1996/97**

| Site #                            | Site                 | Nests         |
|-----------------------------------|----------------------|---------------|
| 1                                 | Islas Diego Ramirez  | 4,500         |
| 2                                 | Isla Noir            | 3,000         |
| 3                                 | Islas Ildefonso      | 2,000         |
| 4                                 | Isla Recalada        | 1,000         |
| 5                                 | Isla Desolación      | 800           |
| 6                                 | Islas de los Estados | >100          |
| 7                                 | Islas Barnevelt      | >100          |
| 8                                 | Islas Terhalten      | >100          |
| 9                                 | Grupo Cabo de Hornos | >100          |
| <b>South American Sites Total</b> |                      | <b>12,000</b> |
| <b>Falkland Islands Total</b>     |                      | <b>&lt;50</b> |

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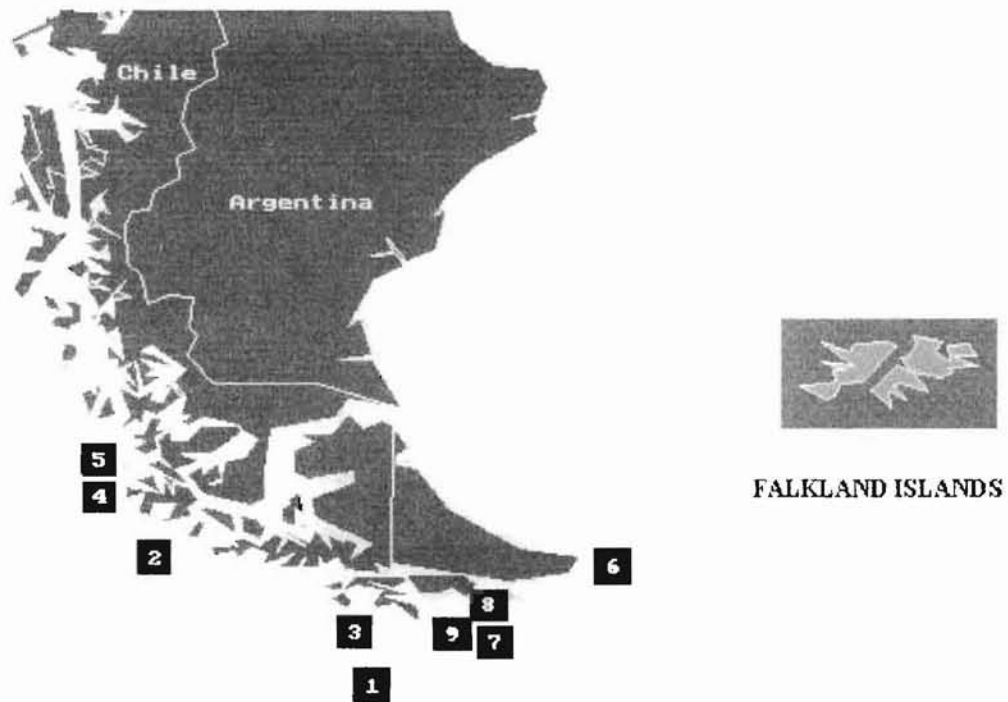


Figure 2: Map of Macaroni Penguin breeding sites.

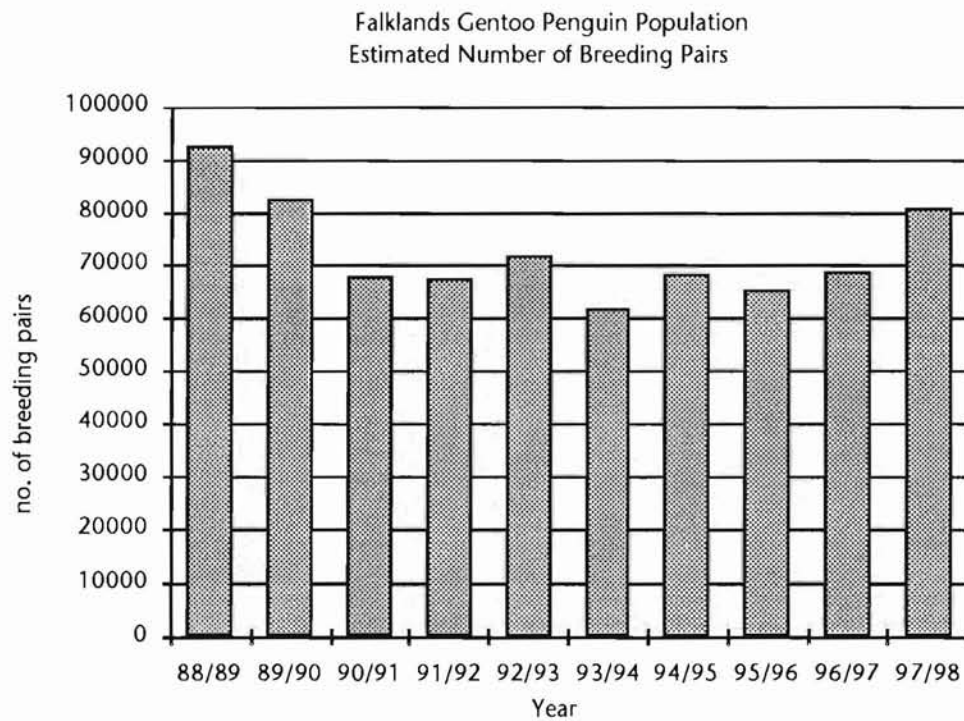


Figure 3: Falklands Gentoo Penguin population trends.



# The Penguins of South America and the Falkland Islands

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occurred during the 1980s and early 1990s (Bingham 1994c, Bingham 1995a, Bingham 1996). Evidence of this dramatic decline can also be seen from the breeding sites themselves. The Falkland Islands breeding sites feature old colonies which have destroyed the vegetation by years of occupancy, leaving only lichen covered rocks and stones around the nest-site. The huge breeding colonies that once produced these areas of barren ground, have now been reduced to small clusters of birds huddled in the centre of their stony territories.

The South American Rockhopper population shows no such evidence of decline, with breeding sites featuring a healthy mixture of new, middle-aged and old colonies, indicating a natural cycle of fluctuation and regeneration. Comparison with previous census data (Venegas 1984, Venegas 1991, Woehler 1993) also indicates that the South American population had been stable throughout the 1980s and 1990s, covering the period when over half the Falkland Islands population had died from starvation. The reason for such differing fortunes is unknown, although it is interesting to note that the waters around Tierra del Fuego and Chile are not heavily fished, whilst those around the Falkland Islands are. In the Falkland Islands, even internationally recognised sites, such as Beauchêne Island which is being considered for World Heritage status, have fleets of fishing boats operating just 3 miles from breeding Rockhoppers.

The Macaroni populations of South America (12,000 pairs) and the Falkland Islands (~50 pairs) must be looked at in the light of a world population of around 9 million breeding pairs (Croxall, in press). These populations are therefore of regional rather than international importance. There were no obvious signs of decline amongst the South American population, and no evidence to suggest that the population has changed greatly over recent years.

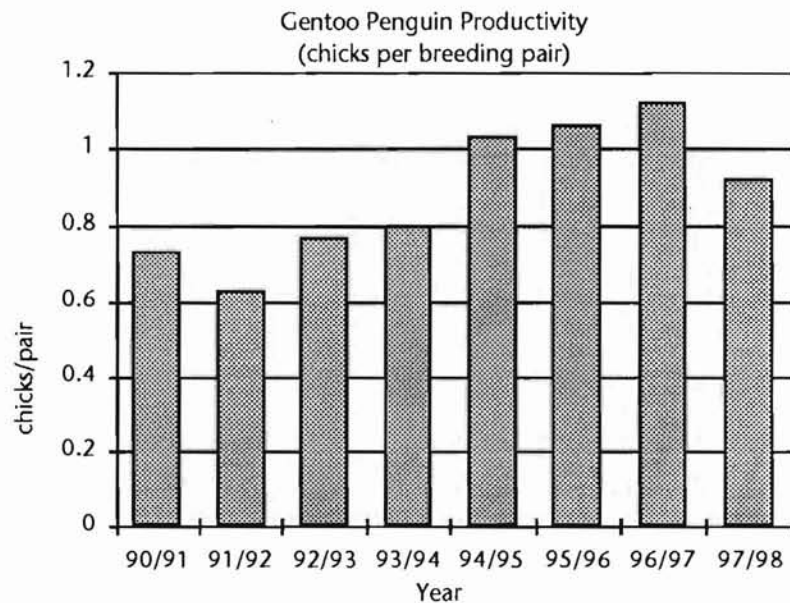


Figure 4: Falkland Islands Gentoo Penguin productivity studies

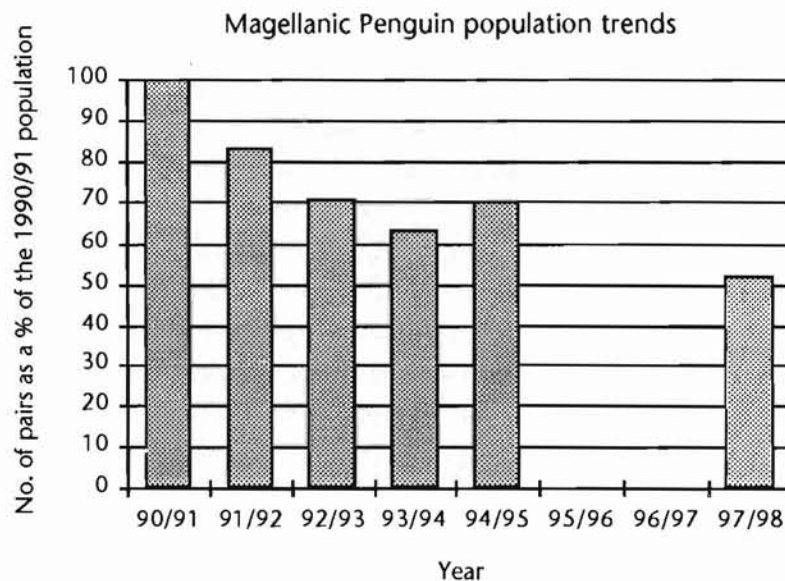


Figure 6: Falkland Islands Magellanic Penguin population trends, showing the number of pairs as a percentage of the 1990/91 population.

The Macaroni is the most numerous of all the world's penguins.

Although the Magellanic Penguins were not included in the 1995/96 and 1996/97 censuses, that is not to say that no work has been done on this species. The current population along the coast

of mainland Argentina is estimated to be 650,000 breeding pairs (Gandini et al., in press). Observations of distribution around Tierra del Fuego and Chile during the 1996/97 census suggest that these regions hold a population at least as large as that of mainland Argentina,

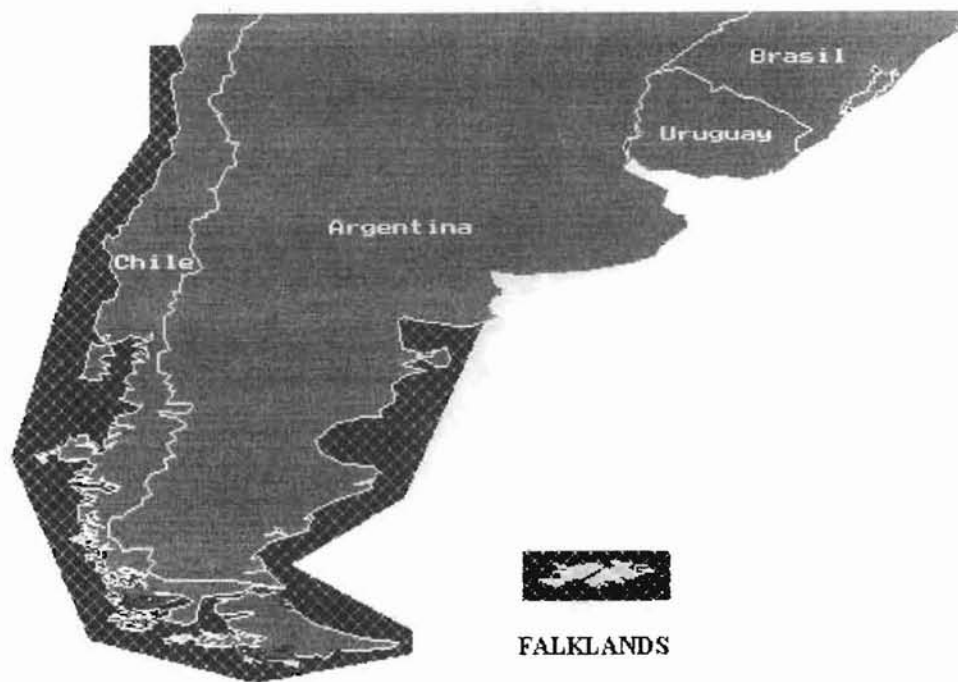


Figure 5: Map of Magellanic Penguin distribution

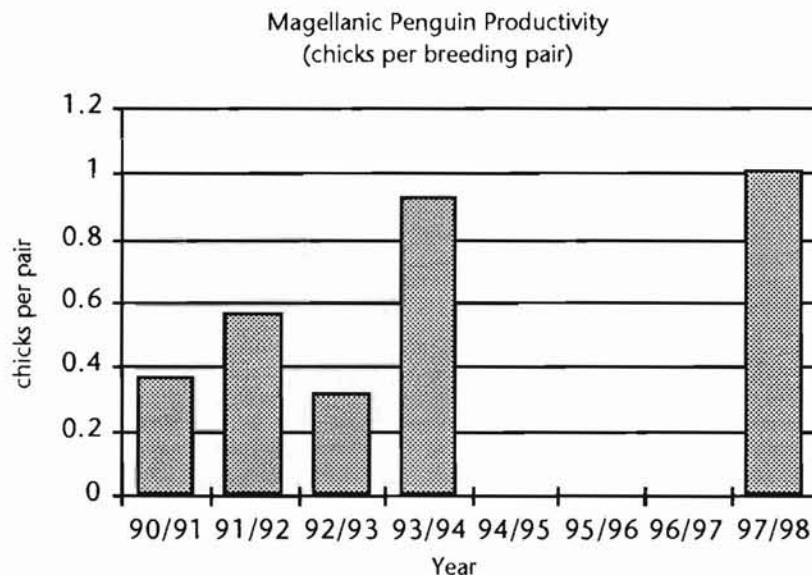


Figure 7: Falkland Islands Magellanic Penguin productivity studies

giving a South American population of at least 1,300,000 pairs. Studies by the Environmental Research Unit indicate that the Falkland Islands population must be well in excess of 100,000 pairs, giving a minimum world population of around one and a half million breeding pairs.

Annual monitoring of selected colonies (Bingham 1994b, Bingham 1995a, Bingham 1995b) shows that the Magellanic Penguin population of the Falkland Islands has declined to about half its 1980s level (Figure 6). These declines coincided with observations of low breeding success up until 1993/94 (Figure 7).

In addition to its Penguin Monitoring Programme in the Falkland Islands, the Environmental Research Unit now conducts similar studies at a number of Chilean breeding sites along the Straits of Magellan. These studies suggest that

*continued on page 14*

# The Penguins of South America and the Falkland Islands

*continued from page 13*



Figure 9: Map of Galapagos Penguin distribution

the Magellanic Penguin decline observed in the Falkland Islands has not been evident in the Magellanic region of Chile, despite its close proximity and similar breeding habitat to the Falkland Islands.

One such site is Isla Magdalena, which lies in the Straits of Magellan and covers an area of less than 1 sq. km. The 1997/98 census conducted by the Environmental Research Unit shows that this tiny island holds a population of around 41,000 breeding pairs of Magellanic Penguin; equivalent to about a third of the entire Falkland Islands population. Comparison with a similar census conducted during 1940 suggests little significant change over the last 60 years (CONAF).

The 1997/98 population in the Straits of Magellan increased by an average of 17% since 1996/97. Chick survival rates were also high during 1997/98, with the lowest rate observed in the Straits of Magellan (range 1.28 - 1.71 chicks fledged per nest) still being higher than

the highest rate observed in the Falkland Islands (range 0.79 - 1.23 chicks fledged per nest).

Further evidence of the differing fortunes of the two regions can be seen from the breeding sites themselves. Magellanic Penguin colonies around the Falkland Islands generally feature a very high percentage of unoccupied burrows, with an average of more than 70% of burrows being unoccupied. Similar breeding sites in the Straits of Magellan hold less than half the proportion of unoccupied burrows (< 35%), suggesting lower levels of adult mortality or higher levels of recruitment. There is no commercial fishing activity around the Straits of Magellan.

South America is also home to the Humboldt Penguin and the Galapagos Penguin, but these species were outside the scope of this census. The Environmental Research Unit has not conducted any research on either of these species, but there are other

organisations that have. The estimated world population sizes of these species are less than 15,000 and 1,000 breeding pairs respectively. (Vargas 1996, Zavalaga 1997).

## Acknowledgements

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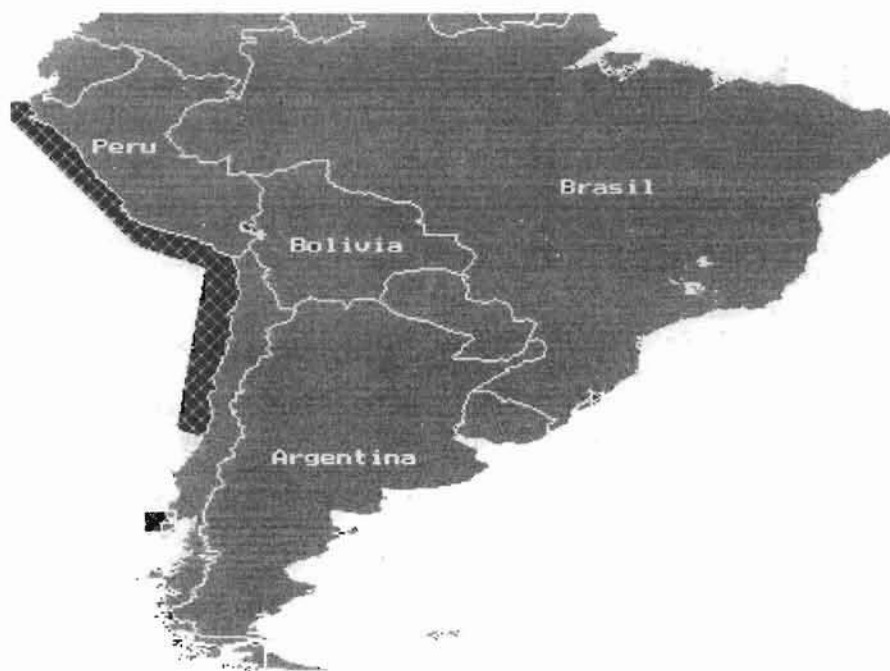


Figure 8: Map of Humboldt Penguin distribution

## About the Environmental Research Unit

The Environmental Research Unit conducts Seabird Monitoring and Baseline Surveying around the Falkland Islands, and holds the most comprehensive database on wildlife resources in the region. The Environmental Research Unit relies entirely upon funds donated by its Directors and supporters. Data generated by our research programmes are provided free of charge to Falkland Islands Government, scientific organisations, and other interested parties, in order that they may

safeguard our natural heritage. This is especially important with oil exploration around the Falkland Islands due to commence in May 1998. Please help safeguard our penguins by making a donation large or small to the Environmental Research Unit.

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