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The second census of Chatham Island shag and Pitt Island shag – are numbers declining?

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Abstract A census of Chatham Island shag (*Leucocarbo onslowi*) and Pitt Island shag (*Strictocarbo featherstoni*), both endemic to the Chatham Islands, New Zealand, was conducted during their 2003/04 breeding season. Totals of 271 pairs of Chatham Island shags and 547 pairs of Pitt Island shags were recorded. Compared with the only previous survey (in 1997/98), numbers of both species were significantly lower. This decline most likely reflects broad scale marine changes affecting the birds' food supply. Alternatively, it may suggest variability in the timing of breeding between seasons.

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INTRODUCTION

The Chatham Island shag (*Leucocarbo onslowi*) and Pitt Island shag (*Strictocarbo featherstoni*) are endemic to the Chatham Islands where they have restricted coastal ranges. Both species were comprehensively surveyed in the 1997/1998 season and estimates of the total number of breeding pairs for the majority of the Chatham's group obtained (Bell & Bell 2000). No other counts have been attempted over the entire island during one season but counts of some colonies have been reported by Fleming (1939), Morris (1977), Robertson & Bell (1984), Imber (1994) and C.J.R. Robertson (pers.comm).

This paper presents results from the second complete census of the Chatham Island shag and Pitt Island shag on the Chatham Islands. The survey was conducted during the 2003/2004 breeding season. Information was collected on nest location, colony size and threats to the colony. Photopoints were also established to identify changes in Chatham Island shag colonies over time. This census was undertaken under the Chatham Island shag and Pitt Island shag recovery plan (Aikman *et al.* 2001), wherein complete surveys of both species are requested every five years.

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METHODS

The census was conducted by two observers from 21 October 2003 to 6 January 2004. The entire coastline of the Chatham Islands was surveyed to locate the shags' nesting colonies following the methods of Bell & Bell (2000). However, the census of The Sisters was undertaken by a birdwatching contingent in rough sea conditions. Only occupied nest sites (or, if late in the season, nests recently used) were counted and mapped. One nest was considered to represent one breeding pair. Roost sites were mapped but individual roosting birds were not counted. Areas surveyed were Chatham Island, The Sisters, The Forty Fours, Western Reef, Ngatikitiki Rocks, Pitt Island, Rangatira, North-East Reef, The Pyramid, Mangere Island, Little Mangere, The Castle, Rabbit Island, Murumurus, Star Keys, Seal Rock, Black Rock, Te Wakaru Island, Fancy Rock, and islands and rock stacks within Te Whanga Lagoon (see Figures 1 & 2).

To determine any temporal variability throughout the season, two Chatham Island shag colonies were surveyed twice, in November and again in December. Searches were performed on foot, by vehicle, by dinghy and by fishing boat. Binoculars and a telescope were used where necessary to view the coastline. A total of 63 person hours were spent searching for shag nests on land, and 20 hours spent searching by boat and dinghy.

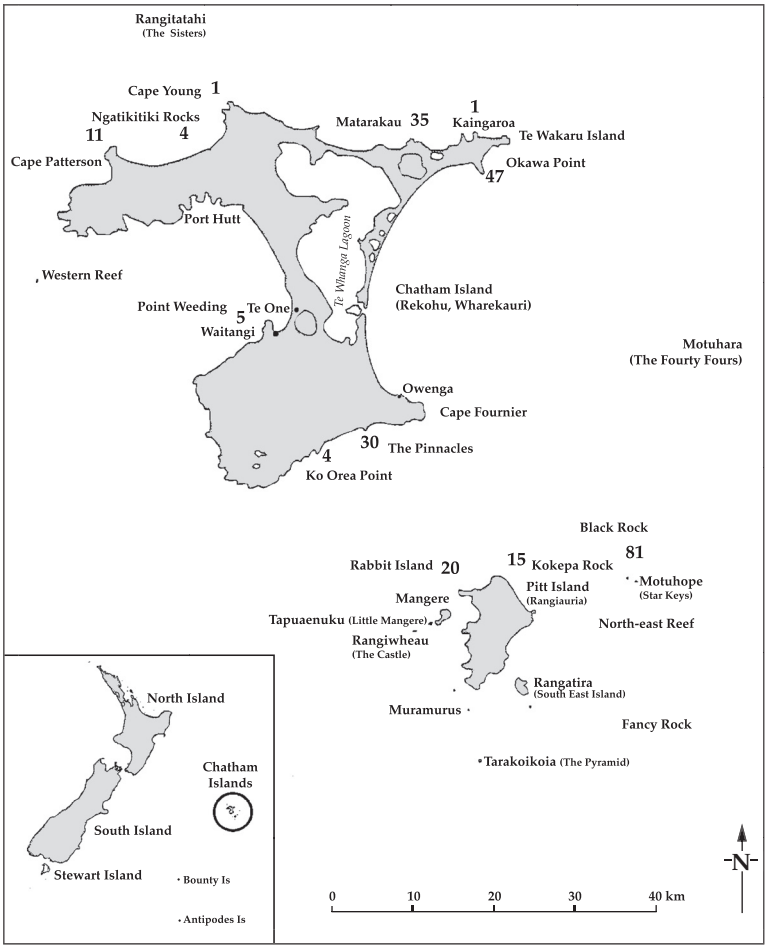

Figure 1 Location and size of Chatham Island shag breeding colonies during the 2003/04 breeding season (n = 271 pairs).

RESULTS

Chatham Island shag

The breeding population of Chatham Island shags was estimated to be 271 pairs distributed at 13 colonies (Table 1). The largest colony was on Star Keys (in two groups, total 81 pairs), followed by Okawa Point (47), Matarakau (35) and the Pinnacles (30). This represents a 67.8 % decrease in total breeding pairs since 1997/98 (Bell & Bell 2000). All colonies had decreased since the last survey, with some colonies totally disappearing (i.e. Cape Fournier and Shag Rock near Motuhinahina). However, some newly-established colonies have been formed at the Pinnacles, Kaingaroa east, Cape Patterson, Cape Young and Kokepa Rock

Pitt Island shag

The Pitt Island shag population was estimated to be 547 pairs (Table 1). The main breeding colonies were Star Keys (43 pairs), Boat Harbour on Pitt Island (35), the south coast of Rangatira (31), Cape Fournier (24), Point Munning (22) and south of Point Weeding (19). The colonies, which ranged in size from 1 to 43 pairs, were more fragmented and widespread than Chatham Island shag colonies. The number of colonies recorded in this survey was similar to previous estimates but the total estimated population represented a 24.9% decline from the 1997/98 census.

DISCUSSION

This survey found Chatham Island shags had a significantly smaller breeding population than the previous survey in the 1997/98 breeding season. Given that the same methodologies were used, this result could constitute a real decline in this species.

Most Chatham Island shag colonies had declined. Two major colonies, Cape Fournier and Shag Rock near Motuhinahina had disappeared completely, although two major new colonies had been established on the Pinnacles and Kokepa Rock, and minor colonies at Kaingaroa east, Cape

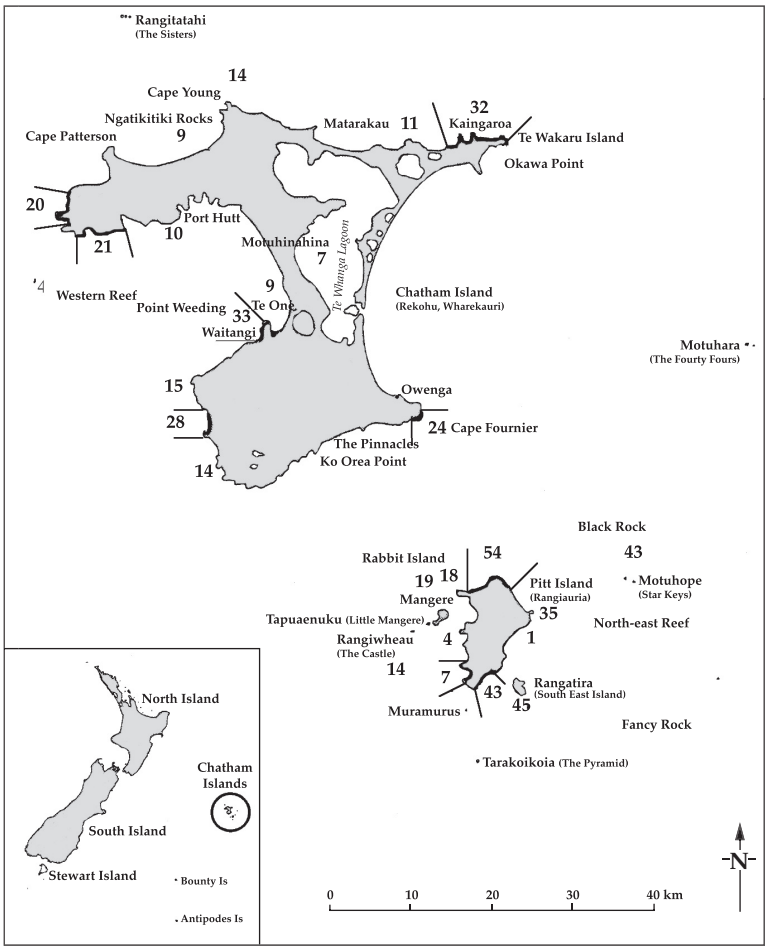

Figure 2 Location and size of Pitt Island shag breeding colonies during the 2003/04 breeding season (n = 547 pairs).

Young and Cape Patterson. Although historical figures are rare, those counts suggest that Chatham Island shags were formerly more common than today. For example, Fleming (1939) mentioned the large colonies on Star Keys and Rabbit Island and that they were 'very common' in Pitt Strait and around the main island. C.J.R. Robertson (in Marchant & Higgins 1990) stated that there were 530 nests on the Star Keys, and Morris (1977) reported 80+ nests at Cape Fournier. In 1961 Okawa Point had 68 nests and Matarakau had 50 nests (Imber 1994). According to Bell & Bell (2000) the number of colonies has been relatively stable over the last 40 years but colony location has tended to vary. Interestingly Bell & Bell (2000) noted that the newly established colony at Cape Fournier in the 1997/98 season was probably due to birds shifting from The Pinnacles. It appears that some of these birds have now moved back to The Pinnacles and have abandoned the Cape Fournier site.

Similarly, Pitt Island shags have decreased significantly since the 1997/98 survey. Pitt Island shags are more widespread than Chatham Island shags and were found predominantly on Mangere, Rangatira, Star Keys, Boat Harbour (Pitt Island) and Point Munning (Chatham Island). A small colony was also found on Shag Rock in Te Whanga lagoon, as previously identified by Bell & Bell (2000). Slightly more birds were found south of Pitt Strait (283 pairs) compared to north of Pitt Strait (264 pairs). The number of colonies has remained stable but colonies have shifted to new locations since the 1997/98 season, suggesting that colonies change quite frequently.

Marchant & Higgins (1990) reported no threats to survival, however, we found recently-used shot gun cartridges at a small Pitt Island shag colony south of Owenga. Recently-used nests were found although no chicks were observed at a time when most other Pitt Island shags had chicks. It

Table 1 Number of active nests of Chatham Island shags and Pitt Island shags observed in 1997/98 (Bell & Bell 2000) and 2003/04 breeding seasons (* count made by visiting birdwatchers in rough sea conditions – count may not be comparable).

Chatham Island shag nests			Pitt Island shag nests		
	1997/98	2003/04		1997/98	2003/04
Ko Orea Pt	7	4	Chatham Island	340	247
Pinnacles	0	30	Rabbit Island	29	18
Cape Fournier	115	0	Pitt Island	141	144
Okawa Point	114	47	The Castle	6	14
Kaingaroa (East)	0	1	Little Mangere	3	0
Matarakau	53	35	Mangere	20	19
Ngatikitiki Rocks	38	4	Rangatira	63	45
Cape Patterson	0	11	Star Keys	46	43
Cape Young	0	1	The Sisters	71	9*
Point Weeding	6	5	The Forty Fours	9	4
Motuhinahina	68	0	Western Reef	0	4
Rabbit Island	83	20			
North-east Reef	19	17			
Kokepa Rock	0	15			
Star Keys	339	81			
TOTAL	842	271	TOTAL	728	547
Locations	10	13	Locations	63	64
% decline		67.82%	% decline		24.86%

is possible that these birds were shot. However, as also highlighted by Bell & Bell (2000), shooting of shags was rare and this disturbance is unlikely to have been enough to bring about the decline found in this survey. Likewise, human or stock disturbance at colonies is unlikely as almost all colonies are difficult to access.

Predation by red-billed gulls (*Larus novaehollandiae*) (Marchant & Higgins 1990), rats (*Rattus* spp.), and possibly cats (*Felis catus*), may be occurring. In the case of the sharp decline on the Star Keys, disturbance by New Zealand fur seals *Arctocephalus forsteri* could also be a factor. Seal numbers are still expanding from the sealing days and they haul out very close to the Chatham Island shag colonies. The steeper cliff nest sites of the Pitt Island shag are less accessible to disturbance from people or predators, and so disturbance offers less of an explanation for their decline. Bell & Bell (2000) identified that 40-80 Pitt Island Shags may be caught in crayfish pots annually. This could be a contributing factor in the apparent decline of Pitt Island shags, although unlikely in the case of the Chatham Island shag as they are rarely caught in crayfish pots.

The decline may also be a response to changes in the marine environment that are affecting the shags' food supply. Climatic and oceanographic fluctuations can have severe impacts on seabird populations (Schreiber & Schreiber 1984,1989; Piatt & van Pelt 1997), including the Phalacrocoracinae (Weimerskirch 2002). Whereas Bell & Bell's (2000) survey recorded more Chatham Island shags than Pitt Island shags, our survey recorded the opposite. If marine environmental changes lie behind these population declines, then Chatham Island shags appear to be the more susceptible.

Variability in the timing of breeding within and between seasons is another possible explanation for the observed decline. Our survey, and that of Bell & Bell (2000), may have been made at different times during the breeding period. Annual variability in the timing of breeding occurs in Stewart Island shag (*L. chalconotus*), king shag (*L. carunculatus*) and spotted shag (*S. punctatus*) and attributed to variability in food and climate conditions (Marchant & Higgins 1990). Fleming (1939), in a December visit to Okawa, saw Chatham Island shag nests in all stages from eggs to fledglings and stated that there was nest stage variability within and between colonies. We also identified some variability in the timing of breeding. As a control, we surveyed Cape Fournier and Shag Rock near Motuhinahina in November and again in December and in both instances no nests were found on the second survey. Perhaps the 2003/04 was a poor breeding season and there is variation between breeding seasons. Further surveys are needed to confirm this and to clarify population trends.

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