

Biological notes on the Western Chain, Snares Islands, 1984-85 and 1985-86

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Published by
Department of Conservation
Head Office, PO Box 10-420,
Wellington, New Zealand

This report was commissioned by Science & Research Division

ISSN 1171-9834

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Reference to material in this report should be cited thus:

Miskelly, C.M., 1997.

Biological notes on the Western Chain, Snares Islands, 1984-85 and 1985-86.

Conservation Advisory Science Notes No. 144, Department of Conservation, Wellington.

Keywords: Birds, mollymawk, shearwater, petrel, prion, crested penguin, Hookers sealion, invertebrates.

1. Introduction

The Western Chain is a small group of rocky islets lying about 5 km southwest of the main Snares Islands (48°02' S, 166°36' E). Four of the five main islets in the Western Chain were landed on in February 1984; bird observations from these landings were summarised in Miskelly (1984). Three further landings on the Western Chain (all on Toru Islet) were made by Canterbury University personnel over the following two summers. These are the only other landings on the Western Chain by biologists since November 1976 (see Sagar 1977). The following notes summarise observations made during landings on Toru Islet on 15 & 29 December 1984 and 19 January 1986.

1.1 15 DECEMBER 1984

Travelled to Western Chain on F.V. McLachlan (skipper Joe Cave). Heather Cameron and Colin Miskelly ashore on Toru Islet 1445-1715 hrs while rest of party scuba diving. Main purpose of visit to confirm six week delay in breeding of Snares crested penguins *Eudyptes robustus* compared to colonies on North East and Broughton Islands. Landing and departure was by dinghy at the penguin landing on the eastern side of Toru Islet.

1.2 29 DECEMBER 1984

Travelled out to Western Chain on F.V. Sea Emerald (skipper Kevin Schofield). Landed and departed from bow on western (cliff face) landing of Toru Islet. Bill Davidson, Colin Miskelly and Gary Scrimgeour ashore 0800-1545 hrs. Main purpose of visit to measure breeding pairs of Snares crested penguins to compare with measurements from North East Island.

1.3 19 JANUARY 1986

Travelled to the Western Chain on F.V. Sea Emerald. Landed and departed via the western landing of Toru Islet. Richard de Hamel, George Knox, Colin Miskelly and Alan Tennyson were ashore 1020-1240 hrs. The main purpose was to check on the breeding status of the various mollymawk species, and to band mollymawk chicks.

2. Birds

2.1 SOUTHERN ROYAL ALBATROSS *DIOMEDEA EPOMOPHORA EPOMOPHORA*

One offshore from Toru Islet on 29 December 1984.

2.2 NORTHERN ROYAL ALBATROSS *DIOMEDEA EPOMOPHORA SANFORDI*

One offshore from Toru Islet on 29 December 1984.

2.3 BLACK-BROWED MOLLYMAWK *DIOMEDEA MELANOPHRYS MELANOPHRYS*

Six nominate race black-browed mollymawks were ashore on Toru Islet on 15 December 1984, including one on an egg (104 x 69 mm) at the same site where there was a pair on 12 February 1984 (Miskelly 1984). This was a new breeding record for the Snares Islands. All six birds were on the eastern side of Toru Islet; three were standing together, and the other three (including the bird on an egg) were well separated from each other. The egg was still being incubated on 29 December 1984 (both adults present, with a third nearby). Another "pair" and a single were about 30 metres away (total of six adults).

The same nest contained a chick (much younger than the Salvin's mollymawk chicks - banded M-47271) on 19 January 1986. No adults were in attendance. Three adults 30 metres away (at same site where seen in December 1984) were banded M-47257-259.

2.4 WHITE-CAPPED MOLLYMAWK *DIOMEDEA CAUTA STEADI*

One flying over Toru Islet on 29 December 1984. An adult was ashore on Toru Islet on 12 February 1984 (Miskelly 1984).

2.5 SALVIN'S MOLLYMAWK *DIOMEDEA CAUTA SALVINI*

Most chicks were past the guard stage on 15 December 1984. Large numbers of non-breeding adults were present (c.1500 adults total). No notes were taken on stage of breeding cycle on 29 December 1984, but one young chick (long dead) was found in a skua midden. Chicks were starting to lose down on 19 January 1986; 69 chicks were banded: M-47260-262, 264-270, 272-300, 331-360.

About 450 pairs of Salvin's mollymawks breed on Toru Islet (Miskelly 1984), with a further 150 pairs on Rima Islet (Sagar 1977; Miskelly 1984).

2.6 CHATHAM ISLAND MOLLYMAWK *DIOMEDEA CAUTA EREMITA*

Three adult Chatham Island mollymawks were among the Salvin's mollymawks on Toru Islet on 15 December 1984, two on the eastern side and one on the north-west. Seven adults were ashore on 29 December 1984, including one that was not as strongly coloured (possible hybrid with *D.c. salvini*). The only bird seen on 19 January 1986 (an adult near the black-browed mollymawk nest) was banded M-47263.

These sightings of Chatham Island mollymawks ashore on Toru Islet bring the total number of sightings ashore on the Western Chain to 16: one on Toru on 26 January 1983, two on Rima on 11 February 1984, two on Toru on 12 February 1984 (Miskelly 1984) and the eleven reported here.

2.7 BULLER'S MOLLYMAWK *DIOMEDEA BULLERI*

Three seen on nests on Toru Islet on 19 January 1986. Five Buller's mollymawks were found on nests there in February 1984 (Miskelly 1984).

2.8 LIGHT-MANTLED SOOTY ALBATROSS *PHOEBETRIA PALPEBRATA*

A single bird flew over Toru Islet twice, about two hours apart, on 29 December 1985.

2.9 SOOTY SHEARWATER *PUFFINUS GRISEUS*

One on an egg in a burrow under *Poa astonii* at the northern end of Toru Islet on 29 December 1984 (first confirmed breeding for Toru Islet). Sooty shearwaters were found breeding on Tahī Islet in February 1984 (Miskelly 1984).

2.10 DIVING PETREL *PELECANOIDES URINATRIX*

Many in skua middens 15 & 29 December 1984. There are no records of live diving petrels ashore on the Western Chain, but they may breed among the small areas of tussock on Tahī and Toru Islets (Miskelly 1984).

2.11 CAPE PIGEON *DA PTION CA PENSE*

Cape pigeons were on eggs on Toru Islet on 15 December 1984. They breed abundantly on all the islets of the Western Chain (Miskelly 1984).

2.12 FAIRY PRION *PA CHY PTILA TURTUR*

One in a skua midden on Toru Islet on 29 December 1984. Remains have previously been found in a skua midden on Rua Islet (Miskelly 1984).

2.13 FULMAR PRION *PA CHY PTILA CRA SSIROSTRIS*

Few fulmar prions were seen on 15 December 1984, but two were noted on eggs and two on small chicks. On 29 December 1984 all the breeding fulmar prions seen had chicks. Of those chicks seen (six), all were downy and the largest had primary sheaths just emerging from the down. One adult was found in a skua midden. Two chicks were seen on 19 January 1986; they were about 10 days more advanced than chicks of fairy prions on North East Island (Alan Tennyson pers. comm.).

These observations suggest that fulmar prions on the Western Chain lay in mid-late October and fledge in early February, i.e. about two weeks earlier than on the Bounty Islands (see Miskelly 1984).

2.14 BROAD-BILLED PRION *PA CHY PTILA VITTA TA*

Two chicks near fledging in a crevice on the eastern side of Toru Islet on 15 December 1984 were a new breeding record for the Western Chain. The chicks had fledged by 29 December. Two dead chicks were found on Toru Islet on 19 January 1986. Skua-killed broad-billed prions had previously been found on Rima Islet (Sagar 1977) and Tahi Islet (Miskelly 1984).

2.15 MOTTLED PETREL *PTERODROMA INEXPECTATA*

Adults were found on eggs in burrows under *Poa astonii* at the northern end of Toru Islet on 29 December 1984. Remains also present in a skua midden. Breeding was first recorded on Toru Islet in February 1984 (Miskelly 1984).

2.16 SNARES CRESTED PENGUIN *EUDYPTES ROBUSTUS*

The penguins were near peak hatching on 15 December 1984, with two thirds of pairs on eggs and one third on chicks. Two clutches were pipping. On 29 December 1984 most penguins were guarding chicks, but two birds were still

incubating (one on one egg and one on two). Seventeen pairs at nest sites were measured on 29 December (Table 1). Chicks were still totally downy and not fully grown on 19 January 1986.

Table 1. Morphometric comparison of breeding adult Snares crested penguins on Toru Islet and North East Island, Snares Islands; 17 pairs measured on Toru Islet on 29 December 1985, 20 pairs measured on North East Island 9 & 10 January 1986. Bill index = (bill length x bill width x bill depth)/10. All other measurements in millimetres. NEI = North East Island.

	Male				Female			
		Toru	NEI	t-test		Toru	NEI	t-test
Bill length	Mean	56.8	58.6	t=2.71	Mean	50.6	52.5	t=3.19
	CV	3.1	3.8	df=35	CV	3.5	3.6	df=35
	Min.	53.7	54.7	p=0.01	Min.	47.5	49.0	p=0.003
	Max.	60.1	62.7		Max.	54.6	56.2	
Bill width	Mean	28.8	28.4	t=0.64	Mean	25.7	25.6	t=0.21
	CV	6.0	5.0	df=35	CV	5.8	6.3	df=35
	Min.	25.1	26.9	NS	Min.	23.5	22.8	NS
	Max.	32.1	32.0		Max.	28.7	28.3	
Bill depth	Mean	33.3	33.7	t=0.83	Mean	28.8	29.5	t=1.79
	CV	5.2	3.9	df=35	CV	4.4	3.9	df=35
	Min.	30.0	31.5	NS	Min.	25.2	27.8	NS
	Max.	36.4	36.0		Max.	30.6	32.5	
Bill index	Mean	5467	5636	t=0.84	Mean	3743	3955	t=1.75
	CV	12.4	9.7	df=35	CV	11.0	6.3	df=35
	Min.	4044	4992	NS	Min.	2849	3490	NS
	Max.	6714	6676		Max.	4613	4484	
Flipper length	Mean	189	189	t=0.03	Mean	179	180	t=0.47
	CV	2.7	2.0	df=35	CV	3.1	2.1	df=35
	Min.	175	181	NS	Min.	171	170	NS
	Max.	197	195		Max.	194	186	

The crested penguins breeding on Toru appear very similar to those on North East and Broughton Islands, although initial impressions that they had shorter bills were confirmed by measurements (Table 1). Of the four standard measurements taken, the only significant difference was in bill length for both sexes. However, the means for bill length for both populations differed by less than 2 mm for both sexes, and there was extensive overlap (Figure 1).

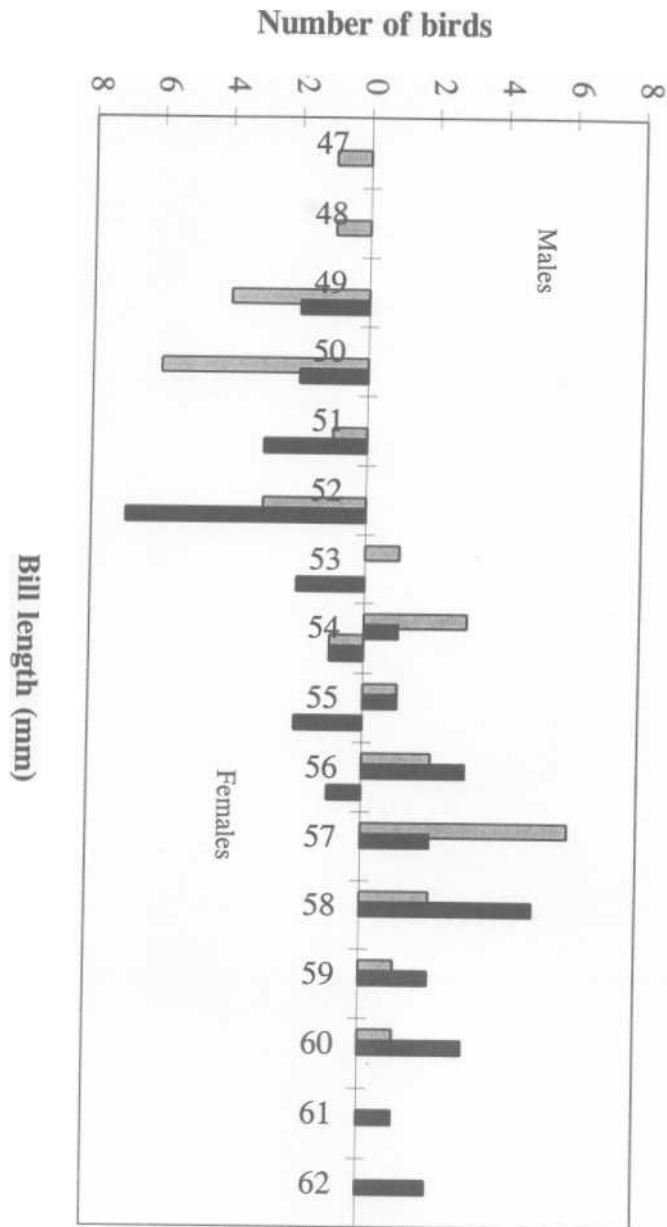


Figure 1. Comparison of crested penguin bill lengths from Toru Islet, Western Chain and North East Island, both in the Snares Islands. Toru Islet = grey; North East Island = black.

Fewer than 500 pairs of penguins breed on the Western Chain (Miskelly 1984). Previous observers had commented on the late breeding of penguins on the Western Chain compared to North East and Broughton Islands (Fleming & Baker 1973; Sagar 1977), and Miskelly (1984) predicted that hatching would occur in mid-December, compared with early November on North East Island (Warham 1974).

2.17 ERECT-CRESTED PENGUIN *EUDYPTES SCLATERI*

An adult was ashore on Toru Islet on 19 January 1986. The only previous record from the Western Chain was an immature in premoult fat on Rima Islet on 11 February 1984 (Miskelly 1984).

2.18 GANNET *MORUS SERRATOR*

One flying close off the eastern side of Toru Islet on 19 January 1986.

2.19 BROWN SKUA *CATHARACTA SKUA LONNBERGI*

A pair had a large chick among *Poa astonii* at the north end of Toru Islet on 15 December 1984; the chick had fledged by 29 December. Breeding skuas were not present on Toru Islet in February 1984, but fledglings were present on Tahī and Rua Islets (Miskelly 1984). It is likely that skua territories include more than one islet in the Western Chain, and the number of pairs present in 1984-85 and 1985-86 is not known.

2.20 RED-BILLED GULL *LARUS NOVAEHOLLANDIAE*

About 20 ashore on Toru Islet on 15 December 1984, but no sign of nesting. The only confirmed breeding by red-billed gulls on the Western Chain was a large chick seen on Rima Islet in February 1984 (Miskelly 1984).

2.21 ANTARCTIC TERN *STERNA VITTATA*

One adult ashore and about 20 immatures, fledglings and adults offshore on 15 December 1984. There is no evidence of antarctic terns breeding on the Western Chain (Miskelly 1984).

3. Mammals

3.1 HOOKER'S SEALION *PHOCARCTOS HOOKERI*

One adult male and one adult female ashore above penguin landing (north of gut on eastern side) on 15 December 1984. One male ashore by penguin landing on 19 January 1986.

4. Invertebrates

Lichenobius littoralis (Anthribidae) was collected on Toru Islet on 15 December 1984.

Both Snares Island endemic weta species were found on Toru Islet on 29 December 1984 - *Henniandrus* [*Zealandrosandrus*] *subantarcticus*

(Stenopelmatidae) under *Poa astonii* at the northern end, and *Insulanoplectron spinosum* (Rhaphidophoridae) under the largest rock tumble on the eastern side.

5. Discussion

Observations during landings on Toru Islet in December 1984 and January 1986 have increased the number of breeding bird species recorded from the Western Chain from nine to eleven (Table 2). The two new breeding records were broad-billed prion, which breeds on at least three other islands in the Snares Islands, and the nominate race of the black-browed mollymawk. The nearest known colonies of this race of mollymawk are on Bollon's Island in the Antipodes Islands (c.150 pairs; Turbott 1990) and on Campbell Island where a few breed among colonies of the New Zealand race *D. melanophrys impavida*. Although only a single breeding pair was present on Toru Islet in 1984-85 and 1985-86, at least five other adults were present (three of which have been banded), and a chick was present (and banded) in January 1986. Future visitors to the Western Chain should attempt to determine the number of breeding pairs of black-browed mollymawks present.

The dense Salvin's mollymawk colonies on Toru and Rima Islets are apparently much more attractive to vagrant mollymawks than the more dispersed (but larger) colonies of Buller's mollymawks on nearby North East and Broughton Islands. No other species of mollymawk has been found among the frequently visited Buller's mollymawk colonies on North East Island, but four species or subspecies (black-browed, white-capped, Chatham Island and Buller's mollymawks) have been found among or near Salvin's mollymawks on Toru and Rima Islets. The large number of Chatham Island mollymawks seen suggests that they may breed among or with Salvin's mollymawks on the Western Chain; this should be checked for during October-November, when both Chatham Island and Salvin's mollymawks would be incubating.

Table 2. Breeding distribution of seabirds within the Western Chain, Snares Islands (modified from Miskelly 1984). • = breeding confirmed, ○ = breeding suspected.

Species	Tahi	Rua	Islet Toru	Wha	Rima
Black-browed mollymawk			•		
Salvin's mollymawk			•		•
Buller's mollymawk			•		
Sooty shearwater	•		•		
Cape pigeon	•	•	•	•	•
Fulmar prion			•		•
Broad-billed prion			•		
Mottled petrel	○		•		
Snares crested penguin			•		•
Brown skua	•	•	•		
Red-billed gull					•

The relationship between the crested penguins breeding on the Western Chain and those on North East and Broughton Islands remains unclear. The observations reported here confirm the six week delay in breeding of penguins on the Western Chain, i.e. they lay their eggs about a week after penguins on North East and Broughton Islands hatch their eggs. This is a huge difference in the timing of breeding for crested penguins, a group of species that are highly synchronous breeders with little between-year variation in laying dates (Marchant & Higgins 1990). Such a large difference in laying dates is likely to restrict gene flow between the two populations, even though they are less than 10 km apart. This study has revealed minor morphological differences between the two populations, and it is unlikely that birds from the two populations could be separated by external morphology. It is possible that the Western Chain penguins are a cryptic species, reproductively isolated from the penguins breeding on North East and Broughton Islands. This could be investigated by comparing rates of gene flow between colonies on North East Island, between North East and Broughton Islands, and between North East Island and the Western Chain.

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