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A scientific name for fulmar prions nesting at Auckland and Heard Islands

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Abstract We describe and name a new subspecies of fulmar prion as *Pachyptila crassirostris flemingi*. This little-known seabird has less than 1,000 pairs breeding at the Auckland Islands and 1,000-10,000 pairs breeding on Heard Island. It is probably largely sedentary around these islands in winter, with possible stragglers reaching mainland New Zealand and Tasmania.

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Keywords fulmar prion; *Pachyptila crassirostris*; *Pachyptila turtur*; Auckland Islands; Kerguelen Island; Heard Island; new subspecies; taxonomy

INTRODUCTION

The history of scientific names used for the fulmar prions (*Pachyptila crassirostris*) nesting at subantarctic Auckland and Heard Islands is complex and confusing. Three subspecific names of fulmar prions - *Pachyptila c. crassirostris* Mathews, 1912, *Pachyptila c. eatoni* Mathews, 1912 and *Pachyptila c. pyramidalis* Fleming, 1939 - are frequently used, for example, by the Ornithological Society of New Zealand Fleming 1953; Kinsky 1970) and in the *Check-list of Birds of the World* (Jouanin & Mougin 1979). After 1990, only *P. c. pyramidalis* and *P. c. crassirostris* were accepted by the Ornithological Society of New Zealand - for Chatham Island and all other fulmar prion populations, respectively (Turbott 1990). *Pachyptila c. eatoni*, the name often applied to Auckland and Heard Island populations, was made a synonym of fairy prion *Pachyptila turtur* (Kuhl, 1820) without explanation (Turbott 1990). However, there are fulmar prions on Auckland and Heard Islands, which are distinct from other fulmar prion populations and thus lack a name. Here we outline why *Pachyptila c. eatoni* is not an available name for them and describe them as a new subspecies.

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TAXONOMIC HISTORY OF FULMAR PRIONS ON AUCKLAND AND HEARD ISLANDS

The taxon *Pseudoprion turtur eatoni* Mathews, 1912 was erected in a three-line description of a specimen from Kerguelen Island in the Indian Ocean. The description is considered to be based on a specimen in The Natural History Museum (NHM), Tring (previously the British Museum (Natural History)), collected in July 1840 (Falla 1937, 1940; Warren 1966). Falla (1937) referred to Cyril Davenport's illustration of this specimen (Fig. 9, Plate 7, in Sharpe 1879), as evidence for it being a fulmar prion and, in 1939 (see Fleming 1980), he confirmed his earlier opinion by visiting the NHM and examining and measuring the specimen himself (Falla 1940).

Falla (1937) believed that the five skua-killed specimens that he found on Heard Island (Indian Ocean) in 1929 were the same taxon as the bird described by Mathews from Kerguelen. The occurrence of this taxon at Heard Island was subsequently accepted by Fleming (1939) and several later authors. Fleming's discovery of the closely-related fulmar and fairy prions both breeding on the Chatham Islands (Fleming 1939) prompted Falla (1940) to treat each of these taxa as full species, as was first suggested by Murphy (1936: 631). After Falla (1940) raised *Pachyptila crassirostris* (Mathews, 1912) to species status, he considered *P. t. eatoni* to be a subspecies of *P. crassirostris*, rather than of *P. turtur*, so used the name *Pachyptila (Pseudoprion)*

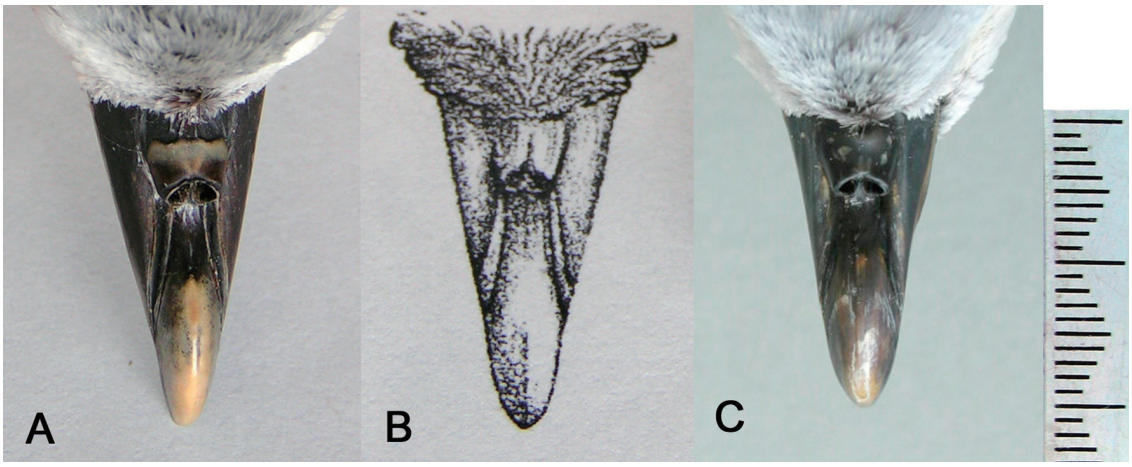

Figure 1 Bill of holotype of fairy prion *Pseudoprion turtur eatoni* Mathews, 1912, NHM 1841.4.720: A. Part of study skin (photo A. Tennyson, copyright NHM), B. Fig. 9, Plate 7, Sharpe (1879). C. Bill of holotype of fulmar prion *Pachyptila crassirostris flemingi* new subspecies, MNZ 17502 (photo A. Tennyson). Scale mm.

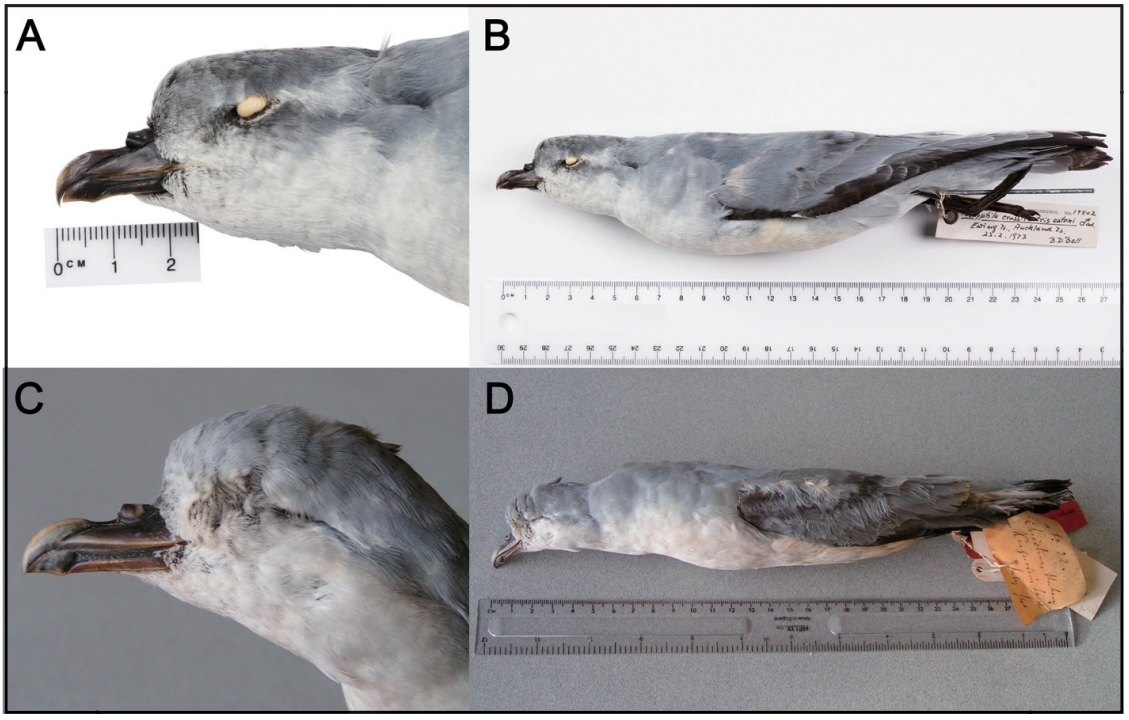

Figure 2 Holotype of fulmar prion *Pachyptila crassirostris flemingi* new subspecies, MNZ 17502: A. Head and bill, B. Study skin (photos M. O'Neill). Holotype of fairy prion *Pseudoprion turtur eatoni* Mathews, 1912, NHM 1841.4.720: C. Head and bill, D. Study skin (photos A. Tennyson, copyright NHM). Scale mm.

crassirostris eatoni for the birds at Kerguelen and Heard Islands. Thereafter, *P. crassirostris* became widely used as the specific name for the fulmar prion (e.g. Fleming 1953).

Oliver (1955) noted that fulmar prions *Pachyptila crassirostris crassirostris* occurred at the Auckland Islands, presumably because specimens were collected there in 1943 (e.g. Museum of New Zealand Te Papa Tongarewa (MNZ) specimens 10474, 10475, 10476, 13040). Fulmar prions from this locality were later reassigned to the subspecies *P. crassirostris eatoni* (see Kinsky 1970; Jouanin & Mougin 1979).

By 1975, there was doubt that fulmar prions had ever bred at Kerguelen, with P.C. Harper suggesting, in Watson (1975), that the holotype of *Pseudoprion turtur eatoni* was a vagrant from Heard Island. For more than 140 years, the type specimen of *P. t. eatoni* was the only known prion of its kind collected from Kerguelen Island. Christmas Harbour (where the type was collected) was a popular shelter for vessels visiting Kerguelen during the 19th century. However, by World War 1, this harbour had been supplanted by the larger and more sheltered bay of Golfe du Morbihan, 120 km to the east, where the current French research station was ultimately established in 1949 (Delépine 1976). It was only in 1984 that sizeable colonies of fairy prions were discovered at Kerguelen, during the first ornithological visit to the rat-free and cat-free Iles Nuageuses, not far from Christmas Harbour (Mougin 1985; JAB unpubl. data). Since then, smaller numbers have been found breeding on Howe Island (Weimerskirch *et al.* 1989), the tiny Ile Grek, in Golfe du Morbihan, and at the foot of cliffs along the south coast (H. Weimerskirch pers. comm.) and the total population for Kerguelen was estimated to be 1,000 - 2,000 breeding pairs (Jouventin 1994).

Reassessment of the holotype of *Pseudoprion turtur eatoni* Mathews, 1912 was clearly desirable in light of the absence of fulmar prions being found during these surveys on Kerguelen, and the potential for the holotype's misidentification due to the similarity of fairy and fulmar prions. Re-examination of the holotype by JAB in 1980 and 1984, P.C. Harper in 1982 and AJDT in 2004 (see Appendix 1) showed that it is a fairy prion and similar to birds from the breeding population of *P. turtur* at Kerguelen (e.g. MNZ 23072). This re-identification had already been published (e.g. Harper & Rowlett 1983; Weimerskirch *et al.* 1989; del Hoyo *et. al.* 1992) but the implications of this finding had not been clearly explained.

The bill shape of the holotype is typical of fairy prions from the Indian Ocean but it may resemble some Heard Island fulmar prions (see Appendix 2, which shows that fairy prions have a relatively narrower unguis than fulmar prions). Davenport's illustration (Sharpe 1879, Plate 7, Fig. 9), as noted by Falla (1937), resembles the bill of a fulmar prion most closely (Fig. 1). This illustration was published more than 50 years before fulmar and fairy prions were regarded as separate species, therefore it is not surprising that the subtle differences between the bills of these species were not accurately portrayed. Falla (1940) did not recognise the type as a fairy prion, possibly because, at that time, the NHM had no comparative fulmar prion material and very few fairy prions (Saunders & Salvin 1896: 436; J. Cooper pers. comm.) and because, amongst fairy prion populations, the bill shape of Indian Ocean birds is relatively close to that of fulmar prions (see Appendix 2).

Thus, *Pseudoprion turtur eatoni* is a junior synonym of the fairy prion *Pachyptila turtur*, as listed by Turbott (1990). Therefore, the overlooked fact that the name *Pseudoprion turtur eatoni* Mathews, 1912: 220, has page priority over *Pseudoprion turtur crassirostris* Mathews, 1912: 221, as recognised by Fleming (1939: 397), is no longer relevant to the naming of fulmar prions. However, the prions breeding at Auckland and Heard Islands are still generally considered to be fulmar prions and, as they lacked a name, they were assigned to the nominate *P. c. crassirostris* by Turbott (1990). Nevertheless, since 1990, *P. crassirostris eatoni* has continued to be used by many authors for Auckland and Heard Island birds (e.g. Marchant & Higgins 1990; del Hoyo *et al.* 1992; Garnett & Crowley 2000; Taylor 2000; Shirihai 2002). Penhallurick & Wink (2004) added further to the confusion by using *P. turtur eatoni* for these birds.

Harper (1980) demonstrated that the fulmar prions breeding at Auckland and Heard Islands were significantly smaller than those from populations of other named subspecies and recommended that they be recognised as a distinct subspecies. However, despite the plethora of scientific names for prions (*Pachyptila* spp.) - more than 50 for about nine currently recognised taxa, including 33 involving Mathews as an author (Turbott 1990; Marchant & Higgins 1990) - there is no available name for the Auckland and Heard Island fulmar prions. Hence, there remains a need to formally name this subspecies.

There appear to be differences in bill shape between populations on Auckland and Heard Islands (see Appendix 2). However, we have taken a conservative approach by lumping these populations under one name, as has frequently been done in the past, pending further analysis of variation. We have based the following description of the new subspecies primarily on Auckland Island specimens because the bill shape of the holotype of *Pseudoprion turtur eatoni* falls outside the range of variation seen in Auckland Island fulmar prions, whereas Heard Island fulmar prions have a bill shape more closely resembling fairy prions (Cox 1980; Marchant & Higgins 1990; see Appendix 2).

SYSTEMATICS

Order Procellariiformes
Family Procellariidae
Pachyptila Illiger, 1811

***Pachyptila crassirostris flemingi* new subspecies**

List of significant incorrect usage of names for this taxon

Pachyptila (Pseudoprion) turtur eatoni; Falla 1937: 203. Heard Island.
Pachyptila (Pseudoprion) eatoni aff. *eatoni*; Fleming 1939: 398. Heard Island.
Pachyptila (Pseudoprion) crassirostris eatoni; Falla 1940: 234. Heard Island.
Fulmariprion crassirostris eatoni; Mathews & Hallstrom 1943: 26. Heard Island.
Pachyptila crassirostris eatoni; Milon & Jouanin 1953: 50. Heard Island.
Pachyptila crassirostris eatoni; Fleming 1953: 20. Heard Island.
Pachyptila crassirostris crassirostris; Oliver 1955: 115. Auckland Islands.
Pachyptila crassirostris eatoni; Oliver 1955: 116. Heard Island.
Pachyptila crassirostris eatoni; Kinsky 1970: 26. Heard Island.
Pachyptila crassirostris eatoni; Condon 1975: 29. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Jouanin & Mougin 1979: 84. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Harper 1980: 277. Auckland and Heard Islands.
Pachyptila turtur eatoni; Cox 1980: 119. Auckland and Heard Islands.
Pachyptila turtur eatoni; Harrison 1983: 252. Auckland and Heard Islands.
Pachyptila crassirostris crassirostris; Turbott 1990: 43. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Marchant & Higgins 1990: 550. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Warham 1990: 428. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; del Hoyo *et al*. 1992: 249. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Garnett & Crowley 2000: 86. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Taylor 2000: 100. Auckland and Heard Islands.
Pachyptila crassirostris eatoni; Shirihai 2002: 181. Auckland and Heard Islands.
Pachyptila crassirostris crassirostris; Dickinson 2003: 73. Auckland and Heard Islands.

Recommended vernacular name

Lesser fulmar prion. This common name is already used widely for birds from Auckland and Heard Islands.

Holotype

MNZ 17502, adult male, bill length 20.7, bill depth 11.2, bill width 9.6, unguis width 5.2, wing length 180, tail length 84.2, tarsus length 31.7, mid toe + claw 39.6 (dry measurements (mm) taken by AJDT). Fresh weight 122 g.

Type locality

Collected at Ewing Island, Auckland Islands, New Zealand, by B.D. Bell on 23 February 1973.

Paratype

MNZ 17499, adult female, bill length 20.2, bill depth 11.5, bill width 8.8, unguis width 4.9, wing length 177, tail length 83.6, tarsus length 33.5, mid toe + claw 41.4 (dry measurements (mm) taken by AJDT). Fresh weight 140.6g. Collected at Ewing Island, Auckland Islands, New Zealand, by B.D. Bell on 23 February 1973.

Description/diagnosis

Based on measurements in this paper and those summarised by Marchant & Higgins (1990), the holotype of *Pachyptila crassirostris flemingi* (MNZ 17502) is smaller than all Bounty and Chatham Island fulmar prions in its bill length, bill width, tail length and tarsus length. The wing length of MNZ 17502 is smaller than all Chatham Island birds and as short as the smallest Bounty Island birds. The unguis width and middle toe and claw length of MNZ 17502 is similar to that of Bounty and Chatham Island birds. The measurements of MNZ 17502 are typical of measurements of Auckland and Heard Island birds (see Table 1, Appendix 3). The colours of MNZ 17502, when being prepared as a study skin, were recorded as: bill lead grey, iris dark brown, tarsus and feet blue, webs grey.

Pachyptila crassirostris flemingi is the smallest race of the fulmar prion. Harper (1980) showed that lesser fulmar prions from the Auckland Islands (n = 9: 6 ♂♂, MNZ 10474, 10475, 10476, 17498, 17502, 17503; 3♀♀, MNZ 17499, 17500, 17501; P.C. Harper pers. comm. to JAB) were significantly ($p < 0.05$) smaller for both sexes in bill length, bill width and wing length and significantly ($p < 0.05$) smaller for males in unguis width and tail length than fulmar prions from the Chathams (n = 20), Bounty (n = 21) and Snares (n = 2) Island populations combined. Cox (1980) stated that Bounty Island birds have dimensions "all greater than those of Heard I. and Auckland Is. *crassirostris*". Marchant & Higgins (1990) noted that Auckland and Heard Island birds were small fulmar prions. This unusual reversal of Bergmann's Rule, with fulmar prions being larger further north, was noted by Falla (1940).

Etymology

Named in honour of the late Sir Charles Fleming. He was a mentor and inspiration to us, was particularly interested in prions (the subject of his MSc thesis) and was an expert on the natural history of the Auckland Islands.

Table 1 Measurements and weights of *Pachyptila crassirostris flemingi* new subspecies. Measurements (mm) given here are from Marchant & Higgins (1990). Unguis width is the maximum maxillary unguis width. Data are presented as mean (1 standard deviation; range; sample size). Sources: A = Heard Island (Museum of Victoria skins), *live weights from 11-19 June (Marchant & Higgins 1990); B = Auckland Islands (MNZ skins - Harper 1980); C = Ocean and Ewing Island, Auckland Islands, live birds 23-24 June 1998 (for details see Appendix 3); D = Ewing Island, Auckland Islands, 23 Feb 1973 (MNZ skins - Marchant & Higgins 1990).

	Males	**Females**	**Unsexed**
Bill length	21.8 (0.74; 20.9-23.4; 11) A	21.4 (0.69; 20.1-22.7; 13) A	22.1 (0.84; 20.8-23.5; 25) A
	20.8 (0.49; 20.4-21.6; 6) B	19.8 (0.69; 19-20.3; 3) B	21.4 (0.94; 20.0-22.9; 12) C
Bill width			10.18 (0.60; 9.1-11.4; 25) A
			10.2 (0.43; 9.5-11.1; 11) C
Unguis width	4.46 (0.35; 4.0-5.2; 11) A	4.32 (0.29; 3.8-4.9; 12) A	4.65 (0.27; 3.9-5.0; 25) A
	5.06 (1.22; 4.9-5.2; 6) B	4.76 (0.16; 4.6-4.9; 3) B	5.0 (0.37; 4.2-5.5; 11) C
Bill depth			9.77 (0.42; 9.0-10.8; 6) A
			10.9 (0.64; 9.9-11.7; 12) C
Wing length	184.5 (4.58; 174-190; 11) A	182.8 (3.09; 177-182; 13) A	174.0 (6.69; 156-184; 25) A
	180.0 (4.65; 175-187; 6) B	179.5 (0.52; 179-180; 3) B	179 (3.3; 174-184; 12) C
Tail length	93.6 (4.60; 87-105; 11) A	93.5 (1.22; 92-95; 13) A	87.3 (4.53; 76.0-97.0; 25) A
	91.2 (2.46; 90.4-94.5; 5) B	91.3 (0.52; 91-92; 3) B	88.8 (3.82; 81.4-96.2; 12) C
Tarsus length	33.3 (0.89; 32.2-34.8; 11) A	33.4 (1.23; 31.7-35.8; 13) A	33.3 (1.08; 31.0-35.2; 25) A
			31.7 (0.80; 30.4-33.1; 12) C
Middle toe + claw	42.5 (1.60; 40.6-44.5; 3) A	42.0 (1.82; 39.7-44.6; 6) A	40.5 (1.36; 38.4-43.3; 12) C
Weight (g)			125.8 (10.07; 102-144; 25) A
			166.4 (10.39; 150-185; 14) A*
			145 (9.7; 132-164; 12) C
			126.6 (8.0; 118.6-140.6; 6) D

DISTRIBUTION AND POPULATION SIZE

A 1984 estimate of 1,000-5,000 breeding pairs on Rose, Ocean and Ewing Islands at the Auckland Islands (Robertson & Bell 1984; Marchant & Higgins 1990) is probably an over-estimate. A nocturnal survey on 23-24 June 1998 found a few hundred (100-400) pairs on Ewing Island and less than 100 pairs on Ocean Island (AJDT unpubl. data). If the species occurs at a similar nesting density on Rose Island (unsurveyed in 1998), only a few hundred pairs would breed there, giving a total population of less than 1,000 breeding pairs at the Auckland Islands. Although the 1998 survey was undertaken in the non-breeding season, we believe that a high proportion of the population was ashore because such behaviour is documented for fulmar prions at Heard Island (Downes *et al.* 1959). This is also the case in the closely-related fairy prion at the Snares Islands (Miskelly *et al.* 2001; AJDT unpubl. data).

On Heard Island between 1,000 - 10,000 pairs breed and individuals have been seen flying ashore on nearby McDonald Island (Downes *et al.* 1959; Woehler 1991).

The at-sea range of fulmar prions is not well known (Watson *et al.* 1971; Harper 1980; Marchant & Higgins 1990). On Heard Island, the only site where year-round observations from a fulmar prion breeding colony are available, adults frequent the colony throughout the year (Downes *et al.* 1959), so this subspecies is probably largely sedentary. *Pachyptila crassirostris flemingi* has not previously been identified away from the breeding grounds but the following beached specimens closely match this race in their small size:

1) MNZ 8690 (skin), found at Wanganui, New Zealand, on 6 July 1955, (dry) measurements: bill length 21.9, unguis width 4.2, wing length 183;

2) MNZ 13426 (skin, now in the Natural History Museum, Paris), adult female, found at Wairoa, New Zealand, on 6 August 1965 by E. Bucknell, (fresh) measurements: bill length 21.8, bill width 11.4, wing length 182.5, tail length 90, tarsus length 31.3, mid toe + claw 42.1, weight 103 g;

3) MNZ 22284 (skin), immature female, found at Palliser Bay, New Zealand, on 14 September 1980 by D. Sim, (fresh) measurements: bill length 21.8, wing length 180, tail length 87, tarsus length 32.4, mid toe + claw 39, weight 90 g;

4) MNZ 22944 (skeleton), immature male, found on Petone Beach, Wellington, on 18 August 1980 by Shane Cotter, (fresh) measurements: bill length 20.8, bill width 9.9, wing length 174, tarsus length 30.5, mid toe + claw 37.5;

5) Found near Mt Cameron West, Tasmania, on 11 September 1995 by AJDT, (fresh) measurements: bill length 21.3, bill depth 9.8, bill width 10.6, unguis width 5.6, wing length 181, tail length 91.4, tarsus length 32.4, mid toe + claw 41.9. This is the only accepted 'mainland' Australian record of fulmar prion (Reid 1999, Birds Australia Rarities

Committee, submission number 198). All former records have been dismissed as being misidentified, erroneous, suspect or unconfirmed (Marchant & Higgins 1990). The measurements of the Tasmanian bird fit only *Pachyptila crassirostris flemingi*, apart from the unguis width, which is 0.1 mm wider than measurements (this paper) for birds of this race. The Birds Australia Rarities Committee considered it to be "most likely of the nominate race", which they described as the "Heard Island Fulmar Prion *P. c. crassirostris*" (Tony Palliser pers. comm. 1998). The specimen was sent to the Museum of Victoria, Melbourne, in January 1996 (Danny Rogers pers. comm. 2003), but it is no longer there (Wayne Longmore & Rory O'Brien pers. comm. 2003) and its whereabouts is unknown.

While the small size of these five birds suggests that their identification as *Pachyptila crassirostris flemingi* is robust, the identity of isolated specimens needs to be treated with caution. The few incidents of 'wrecks' (multiple numbers in a short time) of fulmar prions on New Zealand mainland beaches show that it is difficult to assign fulmar prions away from the breeding grounds to subspecies. For example, the single largest 'wreck' of this species on the New Zealand coast (63 in 1985; Powlesland 1987), included birds of sizes assignable to the largest and smallest subspecies, e.g. for nine skins, bill lengths ranged 21.2 - 23.9 mm and wing lengths 179 - 190 mm (smallest: MNZ 25856 & largest: MNZ 23680). Immaturity rather than subspecific difference may explain the small dimensions of some beached birds.

We suspect that most birds in this 'wreck' were young nominate *P. c. crassirostris* from the Bounty Islands because they were blown ashore from east of mainland New Zealand (Powlesland 1987) and because the Bounty Islands have by far the largest fulmar prion colony (Marchant & Higgins 1990). Other fulmar prion 'wrecks' (e.g. eight in 1978, Veitch 1980; 11 in 1987, Powlesland 1989) included birds of a similar size range to those found in 1985 (MNZ specimens), suggesting the same origin. However, if the 'wrecks' consisted of birds from several breeding sites, then the smallest individuals (e.g. MNZ 23747 & 25856) could have been from populations of *Pachyptila crassirostris flemingi*.

Thus the known at-sea distribution of the lesser fulmar prion is around the breeding grounds, with possible stragglers reaching mainland New Zealand and Tasmania.

DISCUSSION

With a valid name now established for the lesser fulmar prion, it is worthwhile reviewing the taxonomic status of other fulmar prion populations.

Recently, the fulmar prion has been widely accepted as a distinct species (e.g. Harper 1980; Turbott 1990; Marchant & Higgins 1990; Sibley & Monroe 1990; del Hoyo *et al.* 1992; Shirihai 2002; Dickinson 2003). However, a minority of authors (e.g. Cox 1980; Harrison 1983; Penhallurick & Wink 2004) consider *P. crassirostris* to be a subspecies of *P. turtur*.

Nominate *P. crassirostris* (Mathews, 1912) is based on a specimen from the Bounty Islands.

P. c. flemingi new subspecies now applies to birds from Auckland and Heard Islands. It is usually recognised as a distinct subspecies (e.g. Jouanin & Mougin 1979; Harper 1980; Marchant & Higgins 1990; del Hoyo *et al.* 1992; Shirihai 2002).

The Chatham Island race *P. c. pyramidalis* Fleming, 1939 has not been so widely accepted. We regard this race as distinct because the birds are larger than other fulmar prions, with longer bills and wings (Marchant & Higgins 1990) and significantly ($p < 0.05$) wider bills (Cox 1980) for both sexes (Harper 1980). Males have significantly ($p < 0.05$) longer tails than all other fulmar prions (Harper 1980). Robertson & Bell (1984), Turbott (1990) and Hitchmough (2002: 91) recognised *P. c. pyramidalis* as distinct but, paradoxically, Cox (1980), Harper (1980), Marchant & Higgins (1990), del Hoyo *et al.* (1992), Shirihai (2002) and Dickinson (2003) treated *P. c. pyramidalis* as a junior synonym of nominate *P. c. crassirostris*.

CONCLUSIONS

Auckland and Heard Island birds are smaller than fulmar prions from all other populations, and Chatham Island birds are larger. Therefore, we recognise three subspecies:

Pachyptila crassirostris crassirostris Mathews, 1912. Breeding: Bounty Islands and Snares Western Chain (Rima and Toru) (Marchant & Higgins 1990; Miskelly *et al.* 2001).

Pachyptila crassirostris pyramidalis Fleming, 1939. Breeding: outlying Chatham Islands (The Pyramid and The Forty-fours but not the Murumurus) (Marchant & Higgins 1990; Tennyson *et al.* 1993; M. Bell pers. comm. 1997).

Pachyptila crassirostris flemingi Tennyson & Bartle, 2005. Breeding: Auckland Islands (Ewing, Ocean and Rose) and Heard (and probably McDonald) Islands.

All races of fulmar prion are little studied (Marchant & Higgins 1990) and have been assigned a conservation status of "threatened" (Garnett & Crowley 2000; Taylor 2000; Hitchmough 2002).

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Appendix 1

Details of holotype of *Pseudoprion turtur eatoni* Mathews, 1912, *Birds of Australia* 2(2): 220

NHM registration number: 1841.4.720.

Original label states: "No.22 Christmas Harbour Kerguelens' Land July/40".

Warren (1966) noted: "Adult. Reg. no. 1841.4.720. Christmas Harbour, Kerguelen Island, July 1840. Collected by the Antarctic Expedition and presented by the Royal Society and the Admiralty".

AJDT noted (2004): All plumage fairly freshly moulted and unworn. Bill plates a bit worn, indicating that it is not a juvenile.

Measurements (mm) by different researchers

	Falla (1940)	1980 (JAB)	1982 (P.C. Harper)	1984 (JAB)	2004 (AJDT)
Bill length	22	22.3	22.0	22.3	21.1
Bill width	-	-	10.8	11.1	10.7
Unguis width	-	-	4.1	4.5	4.3
Bill depth	11	-	-	-	10.7
Wing length	184	184	184	184	185
Tail length	87	86	-	86	82
Tarsus length	33	33.5	-	33.5	33.2
Mid toe + claw	42	39.4	-	39.4	40.7

Appendix 2

Average ratio of unguis width to bill length for fairy and fulmar prions

Fairy prions from (a) Cook Strait islands (skins MNZ 89, 91, 8425, 9295, 10213, 10464, 26055, 26364, 26365, 26366); (b) subantarctic New Zealand islands (skins MNZ 908, 5608, 5612, 21384, 21411, 21412, 23541, 23542, 25855, 26060); (c) subantarctic Indian Ocean (skins MNZ 23072, 23090, 23091, 23092, 23093, 23094, 23095); (d) South Georgia (skins MNZ 27019, 27020, 27021, 27022); (e) *Pseudoprion turtur eatoni* holotype (skin from Appendix 1). Fulmar prions from: (f) Heard Island (skins MNZ 10477, 17288, 24757); (g) Bounty Islands (skins MNZ 1849, 5609, 5610, 5611, 17286, 18426, 21512, 21513, 21514, 21517); (h) Chatham Islands (skins MNZ 17285, 18300, 18454, 18457, 18459, 18460, 18461, 18463, 18465, 18466); (i) Auckland Islands (skins MNZ 10474, 10475, 10476, 17498, 17499, 17500, 17501, 17502, 17503); (j) Auckland Islands (live birds from Appendix 3). All measurements taken by AJDT.

	Unguis width: bill length (1 standard deviation)	**Range**	**Sample size**
Fairy prion			
a. Cook Strait islands	0.167 (0.012)	0.152-0.184	10
b. Subantarctic New Zealand	0.168 (0.011)	0.149-0.189	10
c. Subantarctic Indian Ocean	0.182 (0.017)	0.160-0.205	7
d. South Georgia	0.187 (0.007)	0.179-0.195	4
e. *P. t. eatoni* holotype	0.204		1
Fulmar prion			
f. Heard Island	0.211 (0.012)	0.197-0.218	3
g. Bounty Islands	0.221 (0.009)	0.209-0.236	10
h. Chatham Islands	0.232 (0.016)	0.209-0.254	10
i. Auckland Islands	0.234 (0.015)	0.211-0.251	9
j. Auckland Islands	0.236 (0.016)	0.210-0.269	11

Appendix 3

Measurements (mm) and weights (g) of live Auckland Island fulmar prions, from Ocean and Ewing Islands, by AJDT on 23-24 June 1998 (sex based on call)

	Bill length	**Bill width**	**Unguis width**	**Bill depth**	**Wing length**	**Tail length**	**Tarsus length**	**Middle toe+claw**	**Weight**	**Sex**
1	21.0	10.2	4.8	11.7	184	91.2	32.3	38.4	164	M
2	20.1	10.1	5.4	11.6	180	88.7	30.9	39.3	153	M
3	21.9	10.7	-	11.0	177	87.6	31.7	42.4	153	?F
4	22.2	10.4	5.5	10.6	183	96.2	32.8	41.2	146	M
5	21.1	10.2	5.1	11.5	177	89.0	30.4	40.6	145	M
6	20.8	9.5	4.8	10.1	181	91.4	31.1	40.1	139	?F
7	21.9	11.1	5.3	10.9	184	92.9	31.7	40.6	141	?
8	20.0	10.0	4.2	10.6	179	86.6	31.0	39.2	134	?
9	22.9	10.2	4.9	11.6	176	88.0	33.1	43.3	133	?
10	20.7	9.7	5.0	9.9	174	87.5	31.5	39.8	152	?
11	22.5	-	5.3	11.3	178	85.2	31.4	40.5	144	M
12	22.0	10.2	5.2	10.2	176	81.4	32.1	40.2	132	?F
Mean	21.4	10.2	5.0	10.9	179	88.8	31.7	40.5	145	
1 *sd*	0.94	0.43	0.37	0.64	3.3	3.8	0.8	1.36	9.7	
Range	20.0-22.9	9.5-11.1	4.2-5.5	9.9-11.7	174-184	81.4-96.2	30.4-33.1	38.4-43.3	132-164	