New Fossil Records of Pelicans (Aves: Pelecanidae) from New Zealand

B.J. Gill¹ and A.J.D. Tennyson²

Auckland Museum, Private Bag 92018, Auckland, New Zealand.
Museum of New Zealand Te Papa Tongarewa, P.O. Box 467, Wellington, New Zealand.

Abstract: A cervical vertebra and a mandibular fragment found 68 years apart in Late Holocene dune sands at Tokerau Beach, Northland, and a left fibula from an archaeological site at Paremata near Wellington belong to a species of pelican (*Pelecanus* sp.) and are new geographic records for pelicans in the New Zealand fossil avifauna. These bones represent at least the ninth and tenth individual pelicans from New Zealand fossil and archaeological sites, and the seventh and eighth from the North Island. Previous records from New Zealand are reviewed. Many pelican bones from New Zealand, including the new finds, seem to be within the size-range of Australian bones of *Pelecanus conspicillatus*. While it is possible that pelican remains in New Zealand represent an endemic form (*P. novaezealandiae*), it is more probable that they merely represent stragglers of *P. conspicillatus* from Australia.

Keywords: Pelican, Pelecanus, Holocene fossils, new records, distribution, New Zealand.

Introduction

The Australian pelican (*Pelecanus conspicillatus* Temminck, 1824) straggles to New Zealand. One was recorded in 1890, and at least five were seen between 1976 and 1978 (Sagar 1978). However, pelicans are also known from bones recovered at fossil and archaeological sites.

The first record of a pelican in New Zealand's fossil or prehistoric avifauna was a partial skeleton found in 1930 at Lake Waikaremoana (Archey 1931). It is not known whether this specimen was given a registration number, but it went missing from the land vertebrates collection of Auckland Museum sometime between its discovery and 1980, and remains lost. Archey assigned it to the Australian species and noted its slightly larger size compared to measurements available for a few Australian skeletons.

Further pelican bones, found at Marfell Beach, Lake Grassmere, Marlborough, in the 1940s and 1950s, and at Poukawa, Hawke's Bay, in the early 1960s, also seemed relatively large and led Scarlett (1966) to propose that the New Zealand birds belonged to a separate subspecies, which he named *P. conspicillatus novaezealandiae*. Rich &

van Tets (1981) had larger samples with which to compare New Zealand material. They raised the New Zealand taxon to species level on the strength of its size, particularly the robustness of the pelvis and the proximal end of the femur. Also, the shape of the ilioischiatic foramen was thought to differ from that of Australian birds.

More recently, Worthy (1998) cited scarcity of remains and lack of morphological distinctiveness as evidence that the pelicans in the New Zealand fossil and archaeological record represent occasional vagrants straggling to this country from the Australian population. Thus the taxonomic status of New Zealand pelicans is unsettled. Resolution of the issue is hampered by inadequate published data on the size of bones of Australian pelicans. The morphometrics of the species are complicated by females being, on average, smaller than males (Marchant & Higgins 1990).

The purpose of this note is to report two new locality records of pelicans from Tokerau Beach (Northland) and Paremata (Wellington). The following institutional acronyms are used: AIM (Auckland Museum, Auckland),

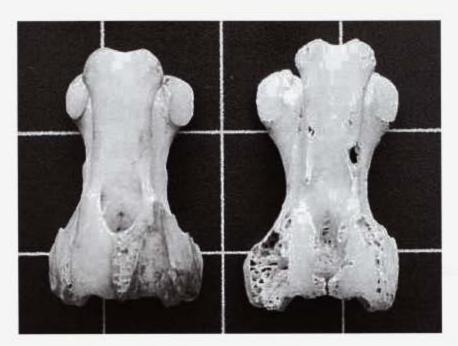


Fig 1. Cervical vertebrae (13th) in ventral view; posterior to top. Right: Fossil from Tokerau Beach, AIM B9446. Left: Pelecanus conspicillatus, AIM B395. Sides of background squares 30 mm. Photo: B. Gill.

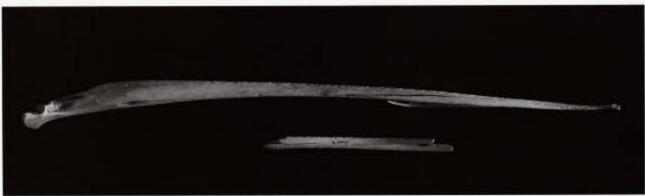


Fig 2. Left side of mandible. Lower: Fossil from Tokerau Beach, MNZ S.39141, c. 170 mm long. Upper: Pelecanus conspicillatus, MNZ 22104. Photo: M. O'Neill.

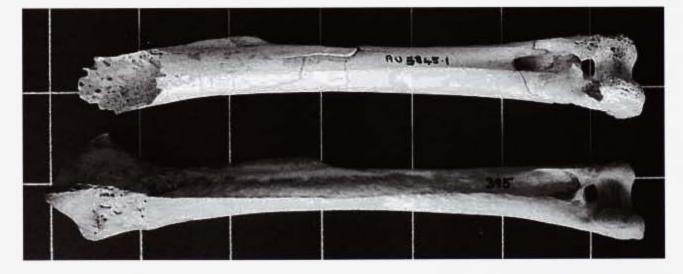


Fig 3. Left tibiotarsi. Upper: Fossil from Puheke Beach, AU 5845.1. Lower: Pelecanus conspicillatus, AIM B395. Sides of background squares 30 mm. Photo: B. Gill.

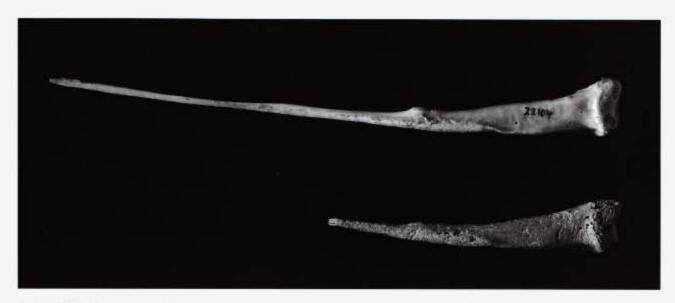


Fig 4. Left fibula. Lower: Fossil from Paremata, MNZ S.23196, 67 mm long. Upper: Pelecanus conspicillatus, MNZ 22104. Photo: M. O'Neill.

AU (Auckland University Geology Department, Auckland), CM (Canterbury Museum, Christchurch), and MNZ (Museum of New Zealand Te Papa Tongarewa, Wellington).

Comparative Material

Reference specimens of Australian pelican (Pelecanus conspicillatus) used in this study were as follows:

- AIM B395 (formerly Australian Museum S728). South Australia. The width of the distal end of the femur is 34 mm, compared to 30-37 mm in 15 other specimens of P. conspicillatus (Rich & van Tets 1981), and the width of the distal end of the tibiotarsus is 24 mm, compared to 20-25 mm in 15 other specimens. Therefore, B395 is about average in size for an Australian pelican.
- (2) AU 9478. New Guinea. Remains of several individuals.
- (3) MNZ 21416. South Canterbury, New Zealand. Immature female.
- (4) MNZ 22104. New South Wales. Larger than MNZ 21416.

Pelican Records

Table 1 summarises the eight fossil and archaeological sites from which pelican bones have been recovered in New Zealand. There are seven in the North Island and one in the South Island, Details of the two new sites (Tokerau Beach

and Paremata) are given below, along with further details for some of the other records. The minimum number of individuals represented by all the records is ten (Table 1).

Tokerau Beach

A group of moa bones in the AIM land vertebrates collection contained an unusual vertebra (Fig 1; now registered as AIM B9446) that BJG identified as Pelecanus from comparison with AIM B395 (Fig 1). The New Zealand vertebra most closely matches the 13th cervical vertebra of the Australian skeleton and is close in size. It has a centrum length of 56.2 mm, and the width across the postzygapophyses is 35.3 mm. Corresponding measurements for AIM B395 are 53.3 mm and 32.2 mm; for AU 9478 they are 53.9 mm and 35.1 mm.

The New Zealand vertebra was collected from sand dunes at Doubtless Bay (= Tokerau Beach), Northland, by E.T. Frost on 30 July 1933. It seems that, on this day, Frost and his son Lincoln, who were living at Lake Ohia, collected a large group of moa bones. They were mostly the bones of chicks and immature birds, and probably belonged to the small species Euryapteryx curtus. The museum registered the whole assemblage as Moa 44, but it has now been split into adult moa bones (AIM B6258) and several groups of chick and immature moa bones (AIM B6257, B6259-62). Besides the pelican vertebra there were bones belonging to an immature seal (now registered as AIM M882), probably

Table 1. Summary of pelican bones found in New Zealand fossil (F) and archaeological (A) sites. MNI = minimum number of individuals represented by the bones. The bones from Waikaremoana are currently missing.

Locality	Reg. No.	No. bones	MNI
Puheke Beach (F)	AU 5845.1	1	1
Tokerau Beach (F)	AIM B9446	1	0.5
Tokerau Beach (F)	MNZ S.39141	1	0.5
Motutapu I. (A)	AIM 1561/25	1	0.5
Motutapu I. (A)	unregistered	1	0.5
Whangamata (A)	AIM AR6344	1	1
Waikaremoana (F)	?	part skeleton	1
Poukawa (A)	CM Av21355, 32001; MNZ S.18328, S.22040, S.22180-2, S.22386	part skeleton + fragments	2
Paremata (A)	MNZ S.23196	1	1
Marfell Beach (F or A)	CM Av12264, 12266, 12482, 13095, 15089, 37194; MNZ S.23215, S.36279	8	2
TOTAL			10

Phocarctos hookeri (Otariidae). It is not known how close an association there was between the pelican bone and any of the moa or seal bones.

On 7 January 2001 at Tokerau Beach, AJDT and S.M. Baird found a fragment of mandible c. 170 mm long (MNZ S.39141; Fig 2) that is a good match for MNZ 22104 in both shape and size. This bone was found in the second row of dunes back from the sea. The exact location was not noted, but it was between 50 m and 700 m south of the end of Simon Urlich Road.

The precise locality of the 1933 vertebra was also not recorded, so its proximity to the mandible fragment is not known. It is unlikely, but possible, that the two bones are from the same individual.

Puheke Beach

Millener (1981: 192) found a left tibiotarsus of a pelican (AU 5845.1, Fig 3) at Puheke Beach, Karikari Peninsula, about 10 km from Tokerau Beach. It is held at AU, not at AIM, as stated incorrectly by Rich & van Tets (1981). It is in poor condition, with the proximal end missing, the shaft damaged, and the distal end badly eroded. Few standard tibiotarsal measurements are possible on AU 5845.1, but the maximum mid-shaft width is 14.9 mm, compared with 13.6 mm for the corresponding bone in AIM B395 (Fig 3). Sufficient bone remains at the proximal end to show that AU 5845.1 was at least 14 mm longer than AIM B395, which has a total length of 191 mm.

Motutapu Island

Bird bones from the 'Sunde' archaeological site (N38/24) on Motutapu Island, near Auckland, included a manual phalanx II from the second digit, originally determined as Harpagornis moorei, but reidentified as Pelecanus novaezealandiae (Millener 1981: 798). It was excavated before 1970 by S.D. Scott from beneath the Rangitoto ash layer of c. 600 years BP, and is now in the AIM Archaeology Department (reg. no. 1561/25). An accompanying label shows that in 1981 P.R. Millener and G.F. van Tets considered it to be a 'right phalanx II of digit major ... similar in size and shape to large P. conspicillatus'. This phalanx is a thin-walled, hollow bone that is much eroded. It has a total length of 49.5 mm, which is a little short of the original intact length. BJG compared it to the same bone in AU 9478 (total length = 51.3 mm). The two are a fair match for shape and roughly the same size.

Also from the Sunde site are two tibiotarsal fragments excavated from beneath the ash layer by R. Nichol (Nichol 1988: 242; excavation reference Eg1) and held in the Auckland University Anthropology Department. Nichol identified them as pelican by comparison with AIM B395 (R. Nichol, pers. comm.). BJG examined these fragments in 2002. They are 67 mm and 64 mm long, and appear to have been originally joined to each other. The size and surface features of these fragments show that they very probably formed part of the mid-shaft of a left tibiotarsus of Pelecanus.

Both the phalanx and tibiotarsus from the Sunde site may be from the same individual (Nichol 1988: 243), and may or may not be midden-associated.

Whangamata

Bone material excavated by R.G.W. Jolly in 1976 at the Whangamata Wharf site (N49/2) included a pelican bone (Davidson 1979) now held in the AIM Archaeology Department (reg. no. AR6344). It is a cervical vertebra of Pelecanus and matches the 7th vertebra of specimen AIM B395 in shape most closely. It was labelled by R.J. Scarlett as being either the Australian or New Zealand pelican, probably the latter. However, it is small, the centrum length being 46.8 mm (53.7 mm in AIM B395) and the width across the postzygapophyses 20.1 mm (23.8 mm in AIM B395).

Paremata

A pelican left fibula (proximal end; 67 mm long; MNZ S.23196; Fig 4) was found by G.S. Markham in April 1967 at the 'Moa Hunter Site', Paremata, Wellington. Fig. 4 shows that it is similar in size to the corresponding bone in MNZ 22104.

Discussion

The New Zealand pelican bones discussed in detail here, including the new records, seem to be within the size range expected for Australian bones of Pelecanus conspicillatus. Some are towards the large end of the range (eg, the Puheke Beach tibiotarsus), while others are about average (eg, the Tokerau Beach vertebra), and the vertebra from Whangamata is rather small. The overall sample sizes are still too small to establish whether there are any significant size-differences between Australian and New Zealand specimens, but the newly identified New Zealand pelican bones do not support the concept of a larger New Zealand taxon. Furthermore, a recent skeleton of P. conspicillatus from New South Wales (MNZ 22104) has an identical width across the antitrochanteric processes of the pelvis (97.5 mm) to the holotype of P. novaezealandiae, which is larger than for any of the P. conspicillatus measured by Rich & van Tets (1981). This purported character for distinguishing the taxa therefore appears to be unhelpful. There seems to be little evidence that pelican remains in New Zealand represent an endemic form, and it may be best to regard New Zealand specimens as conspecific with P. conspicillatus, as suggested by Worthy (1998), until new evidence shows otherwise.

The Australian pelican exploits a wide range of terrestrial wetland, estuarine, and marine habitats, and it needs undisturbed islands or spits for colonial nesting (Marchant & Higgins 1990). It is possible that pelican populations were self-sustaining in New Zealand, because suitable habitats appear to be present.

This review shows that, while pelicans have been found at eight fossil and archaeological sites in New Zealand, the minimum number of individuals represented is only ten. Pelican bones are large and robust, and would be expected to persist well as fossils. Pelicans tend to be gregarious and nest in colonies. If New Zealand had self-maintaining pelican populations, then bones indicative of more individuals than have been found would be expected.

Hence the merit of the suggestion that the pre-European records of pelicans in New Zealand, like the contemporary records, represent stragglers from Australia (Worthy 1998).

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