Therefore, removal of Wekas from Open Bay Islands could mean the loss of a potentially important reservoir.

Nonetheless, Weka predation on Taumaka may be nearing the threshold at which other species cease to co-exist. We believe that a detailed study of the effects of Wekas on the flora and fauna of the Open Bay Islands is urgently needed. These effects must then be balanced against the value of the islands' otherwise pristine nature, the importance of native populations that will require protection if they are to remain, and the value of a thriving Weka population. Removal of Wekas, possibly only to the adjacent mainland where they are reported to have declined in recent years (B. Glubb, pers. comm.) may be an ideal and relatively inexpensive solution.

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Unique, dark olive-green moa eggshell from Redcliffe Hill, Rakaia Gorge, Canterbury

Moa eggshell is known from many, widely distributed localities throughout New Zealand, having been most frequently found in dunesand and loess deposits and beneath rock overhangs which have been used as nesting sites. It also occurs on archaeological sites and in swamps and caves. Most is buff or creamy white, but pale green moa eggshell has also been collected, notably from Otago (see Hutton 1876, White 1886). This pale green shell is similar

to that of the eggs of some species of duck and, in fact, was initially mistaken for such by White (1876).

In 1971, some eggshell was found by a Canterbury Museum party on the floor of a limestone rockshelter near the summit of Redcliffe Hill (1000 m), on the south bank of the Rakaia River, a little over 20 km upstream from Mt Hutt in Canterbury. Some of the shell was exposed on the surface, but despite this, had remained well preserved owing to the protection afforded by the rock overhang.

A team from the Museum carried out an investigation of the site over several days, using archaeological techniques of excavation and recording. Eggshell fragments of various thicknesses and colours were recovered, with the moa shell being clearly distinguishable from the rest which, clearly, were from much smaller species of birds. Among the moa shell fragments were some which were of various shades of cream and a few pieces which were pale green. Most distinctive, however, were some fairly large, very dark olive-green fragments (blackish green when damp, drying to olive drab). This colour, not previously reported for moa eggshell, is similar to that of some of the darkest eggs of the Emu *Dromaius novaehollandiae* (Latham 1790). These olive-green pieces seemed to have all been part of a single egg. Roughly a third of the lower portion of the egg, cracked into numerous pieces, remained in position in the ground, forming a saucer-like container into which some of the upper fragments had fallen; the remaining pieces recovered had been scattered about the shelter. None of the pieces showed the characteristic polish of incubation.

There was no evidence of nesting materials or of deliberate hollowing out of the shelter floor but, from the quantities of eggshell present, the shelter had been used for nesting by a variety of bird species. There was no evidence of human activity in the shelter, though a carbon-14 date of 663 + 51 years BP (NZ 1725), obtained from some of the moa eggshell, indicates that it was in use as a nesting shelter within the Polynesian period.

It is estimated that about half the olive-green egg was recovered, although not all the pieces could be fitted together. The reconstructed portion is not enough to determine the original curvature of the egg and so to allow an accurate estimation of its size. However, it would appear to have been somewhat smaller than the egg of *Emeus crassus* (Owen 1846) recovered from within a skeleton in Pyramid Valley swamp (the only moa egg in existence which can definitely be attributed to a particular species of moa). Apart from its unusual colouration, the Redcliffe egg (shell thickness, 1.16 mm) resembles those of other moa species in having typically linear pore-grooves. There is no reason to believe that the colour is other than original or that the shell is stained in any way; all the cream moa eggshell fragments recovered from the same deposit were in good condition and free from staining.

Oliver (1949) hazarded a guess that pale green moa eggshell found in Otago might belong to *Megalapteryx didinus* (Owen 1883). Simpson (1955) concurred that Oliver's was a reasonable deduction; he also noted that some originally pale green eggshell in museum collections had faded to white. The dark and pale green shell fragments from the Redcliffe shelter are almost certainly from two different eggs – possibly even two different species; they

are of different thicknesses and there is no indication that the paler pieces have faded from dark green. It should be noted, however, that in many species of bird there can be considerable intraspecific variability in the depth of colour of their eggs (O'Connor 1985).

Other than *Megalapteryx* the only species of similar size to which the dark green shell might belong is *Anomalopteryx didiformis* (Owen 1844). The only *Anomalopteryx* remains found with eggshell are those from Echo Valley, Fiordland (Forrest 1987); the shell there was cream or white, but the relationship between the bird's remains and the shell was not clear.

In default of any more direct evidence it may be appropriate to attribute the dark green Redcliffe eggshell to *Megalapteryx* on the basis that this species is more commonly found at higher altitudes (c.500 m or more) than any other (Worthy 1989).

Although moa eggshell has been found at a wide range of sites throughout New Zealand, no formal studies of moa nesting sites have been made and almost nothing on such sites has been published. I would appreciate any information on moa nesting sites which readers may come across in the course of field work.

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