

have shown little increase. Maloney reviewed Black Stilt management and highlighted some of the problems of managing rare species in degraded habitats. Lessons from the past now make effective management possible and he predicted an increase in Black Stilt numbers in the next few years. He noted that braided rivers have little effective protection despite their unique biological associations and the threatened species reliant on them.

The symposium concluded with two presentations that described some of the activities of Canterbury OSNZ members and the contributions local members have made to Canterbury ornithology.

LITERATURE CITED

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Abstracts of talks from birds in Canterbury Symposium

The late Holocene avifauna of Canterbury

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Knowledge of the avifauna of Canterbury before human settlement has been expanded greatly in the past decade. New fossil sites have been found, excavated and interpreted. The faunas in major sites already known have been reinterpreted. The recognition, location and study of fossil deposits accumulated by laughing owls and falcons has resulted in a much better understanding of the former distribution of small species not well preserved in swamps or dune deposits. A picture is emerging of a diverse avifauna. A feature was the presence of colonies of several species of petrels, including storm petrels, diving petrels, gadfly petrels, and small shearwaters. The moa fauna was characteristic of the eastern South Island, and unlike that of the wet West Coast. Both large predators, Haast's Eagle (*Harpagornis moorei*) and Eyles's Harrier (*Circus eylesi*), were common. There was a full range of waterfowl,

shags, and waders. Work is progressing on the ecology of extinct species, and the assemblages in the avifauna, such as guild structure. Several species that are still common elsewhere, such as the Tui, used to be abundant in Canterbury. Most of the species in some guilds, such as the terrestrial herbivores, are either locally or globally extinct.

Chemical tracers of former mainland seabird breeding colonies

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Seabird breeding brings large quantities of nutrients ashore. Palaeontological methods have shown widespread pre-human seabird breeding on the New Zealand mainland, implying that prehuman New Zealand was less oligotrophic than today. However, it is often hard to infer a species' absence and to estimate colony extent. Further, preservation of material is limited in humid, low pH environments. Because soils are often old, we looked for soil indicators of former seabird breeding. We used predator deposits to identify two former breeding sites on calcareous soils in North Canterbury, and a control in Nelson. Maori tradition was used to identify an acidic site on Banks Peninsula, to see if results agreed with the calcareous soils. High total P, total N, total Cd, and $\delta^{15}\text{N}$; and low C:N and Cd:P ratios were found at former breeding sites on calcareous soils, but results from the acidic site showed likely confusion with agricultural inputs. Total Cd showed no potential for confusion with agricultural inputs, but is only applicable to calcareous soils. We are presently investigating $\delta^{13}\text{C}$ in deeper soil, where soil organic matter is older. The sole depth profile examined so far shows increasing $\delta^{13}\text{C}$ with depth, consistent with former seabird breeding.

Breeding of South Island Pied Oystercatchers (*Haematopus ostralegus finschi*) on farmland in mid Canterbury, New Zealand

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Breeding of South Island Pied Oystercatchers (*Haematopus ostralegus finschi*) on farmland in mid-Canterbury was studied during 1987 to 1996. Birds returned to breeding territories from early June, with females arriving about six days earlier than males. Laying dates extended from early August to mid November and were similar in all years. Most first clutches were laid from late August to mid September and up to two replacement clutches were laid. Clutch size averaged 2.26 (range 1 to 3 eggs) and declined through the breeding season, but was consistent from year to year. First clutches were larger than replacement clutches. About half the eggs