Black-fronted Tern breeding at high altitude

On 12 January 1986, during a tramp along the summits of the Pisa Range, Central Otago, I was surprised to see four Black-fronted Tern (*Sterna albostriata*) flying about and occasionally hawking moths over the tundra zone at c.1860 m (6100ft) near the head of the Leopold Burn, and an hour later four were seen near Mt Dottrel (*sic*) at c.1700 m (5580ft), 4 km SW of the first sighting. The weather was poor with a cold easterly drizzle drifting across the range and thick cloud enveloping the eastern escarpment. I thought at the time that the birds had probably been swept up on this easterly from the Clutha River valley below, where small flocks are scattered along the river's shingly reaches and often feed over adjacent irrigated pastures. My previous highest sighting for this species was at c.1070 m (3500ft), when several were hawking moths over tussock-covered slopes of the Hawkdun Range on a very warm summer evening in 1971 (*Notornis* 22:148).

The previous highest breeding records in Central Otago were on the upper Manuherikia River above Falls Dam, and in the Nevis valley, both at c.690 m (2250ft); elsewhere I have recorded breeding on the upper Cass River, Lake Tekapo, at c.1040 m (3400ft).

My wife and I returned to this Pisa Range area on a very warm fine day (19.1.86). Near the headwaters of a small unnamed tributary of the Colour Burn, about 2 km SW of the original sighting, we came upon a breeding colony of about 50 terns.

The site: Map reference: NZMS 1, sheet S 124 Cardrona; grid: 960857. The colony was scattered over an area of about half a hectare, at c.1720 m (5650ft), on a north-facing gentle slope of 15-20°; obviously a relatively warm face giving good drainage (with a substrate of mica schist gravels and slabs) to the headwater seepages of a tiny tributary of the Colour Burn, which itself drains into the Roaring Meg stream and thence into the Kawarau River. There were a few minor rock outcrops nearby but none of the areas of shingle with which one usually asociates this tern's breeding habitat. The surface was of hummocky terrain typical of much of the Central Otago 'tundra' with one or two more even-surfaced patches further down the slope.

The vegetation: The characteristic tundra association of *Dracophyllum muscoides/Hebe hectori* dominates the hillside, interspersed with many small species of alpine lichens, mosses and flowering herbs, notably *Celmisia viscosa*. There were a few small clumps of the high-altitude snow-tussock *Chionochloa macra*, here nearing its upper altitudinal limit.

The colony: It was difficult to determine just how many pairs were still breeding. At least eight of the group were immatures from the previous season. Some pairs could have already lost eggs or chicks to local predators, of which the Black-backed Gull (*Larus dominicanus*) is probably the most persistently threatening, but others include the New Zealand Falcon (*Falco novaeseelandiae*), stoat (*Mustela erminea*), and Australasian Harrier (*Circus approximans*). We thought it significant that, on this unusually warm day, we saw three individual Harriers above 1830 m (6000ft) because the Harrier is not often recorded at very high altitude in Central Otago. We found no Black-fronted Tern nests with eggs, but we noted at least three pairs with

nestlings ranging in age from one day to one week. All were situated in the dead hearts of clumps of the low-growing alpine daisy *Celmisia viscosa*, where they would gain considerable protection from the winds and storms of this mostly inhospitable environment (e.g. a week after we found this colony, a southerly storm dumped a liberal coating of snow on the range-tops).

Scattered throughout the colony area and environs were a post-breeding flock of more than 100 Banded Dotterels *(Charadrius bicinctus)* and a few South Island Pied Oystercatchers *(Haematopus finischi)*. One or two Skylarks *(Alauda arvensis)* were singing nearby.

Food sources: Lizards and fish are obviously absent from the tern's diet at these altitudes. The invertebrate food items would be mainly day-flying moths, dipterous flies, cicadas and other aerial insects and their larvae, including some aquatic stoneflies and caddisflies; also some large black ground beetles and weevils, which are a feature of this habitat type; and a very large form (possibly a subspecies) of the common Main Divide grasshopper *Sigaus australis*. Brian Patrick, a Dunedin entomologist, estimates (pers. comm.) about 60 species of resident moths and an equal number of beetles. In most years insects would be available from about mid-October to early May.

Although a local runholder told us that the tern had been breeding there for 'a number of years' it is worthwhile speculating whether the species has been forced to these altitudes through increasing loss of habitat (caused by adventive weed species) on the smaller riverbeds below, e.g. Cardrona, Lindis, over the past 20 years or so.

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