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THE ESTABLISHMENT, DISPERSAL AND DISTRIBUTION OF THE SPUR-WINGED PLOVER IN NEW ZEALAND

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ABSTRACT

The Spur-winged Plover *(Lobibyx novaehollandiae)* is an Australian species, self-introduced to New Zealand in 1932 and now established as a breeding species in Southland and parts of Otago. Its establishment and present distribution are outlined. The method of spread in five different localities is demonstrated. Local movement is described.

ARRIVAL AND EARLY ESTABLISHMENT

In 1946 the late Very Rev. C. J. Tocker reported the early establishment of the Spur-winged Plover in New Zealand to the Southland Acclimatisation Society in the following words:

> " Some twelve years ago one of the Borstal farm managers, Mr John Bell, told me of a pair of strange birds which had settled on the Borstal farm a couple of years earlier. They had lived, but some of the chicks had been lost. There were then five birds. I went over with my binoculars on two occasions and managed on the second to stalk up close to the birds, which are very furtive and difficult to approach, and get a good steady view. I had no difficulty in identifying them as the Australian Spur-winged Plover, *Lobivanellus lobatus.* I have watched the colony with interest ever since. I should say there are now from thirty to fifty birds. To my personal knowledge several have been shot in the last two shooting seasons, not wantonly, though there is always a danger of that, but through genuine mistake. The birds' area is now extended south as far as Awarua Plains, and west as far as Taramoa. I have little doubt that as they increase they will extend their territory . . . The bird, I am sure, ought to be given protection." (Dept. of Internal Affairs File).

This report was forwarded to the Department of Internal Affairs in May 1946 and the species was given full protection in September 1946.

Mr. Tocker's report fixes the date of the first arrival as approximately 1932 (two birds). In 1934 there were five birds. By 1946 there were 30 to 50 spreading to Awarua Plains and Taramoa (areas within a six-mile radius of Invercargill).

By 1951 the numbers had increased to approximately 100, extending in range to the mouth of the Waimatuku River and the Oreti River near Oporo, both within ten miles of Invercargill (Sansom 1951). Numbers increased steadily in the Invercargill area until the 1960s. Since 1965 numbers in this area have remained fairly stable.

Between 26 September and 5 October 1971 a count was made of all birds within a 10-mile (16 km) radius of the Invercargill Post Office. I am grateful to Mr R. R. Sutton for helping with this work. In September/October birds are breeding and on territory, and there was no danger of counting any bird more than once, even though the count could not be made in one day. No chicks or juveniles were included. The total was 827. At a conservative estimate this would be two-thirds of the actual number. The approximate 1971 population within a 10-mile radius of Invercargill is therefore 1240 birds.

METHOD OF SPREAD

From 1965 to 1970 the Spur-winged Plover was the subject of a study by a group of Southland ornithologists. The main purpose was to collect breeding data, and a paper on this aspect of the study appears in this issue (Barlow, Muller & Sutton 1972). At the same time the banding programme which was essential to the study provided some information on movement and distribution. The use of colour combinations allowed sight recognition of individuals.

Breeding adults banded totalled 119. The adults remained in the same area year by year. Fledged young birds remained with the parents until they were 8 to 10 months old. They then did one of three things:

1. Remained and bred in the vicinity of their natal area, occupying an area left vacant by death of an "old" bird.
2. Moved to a nearby area and remained and bred there.
3. Left the area.

TABLE 1 — DISPERSAL OF FLEDGED YOUNG

No. in sample	Sightings, second or subsequent year		No data
	Natal area	2-3 miles from natal area	
70	14	12	44

The dispersal of a sample of 70 fledged young, all of which had the same chances of being re-sighted, is shown shown in Table 1.

In the study area the species numbers remained fairly stable. It is therefore safe to assume that the area held its optimum breeding population. At the same time, land usage within the area caused modification of habitat, sometimes to the birds' advantage, sometimes not. While some habitat was lost to housing, industrial development, and regrowth of vegetation, new habitat was provided by the clearing of scrub-covered land previously unsuitable for the species.

The species spread throughout the country by two methods:

1. The " ink-blot " spread: birds bred at the perimeters of an established breeding area and this became a continuing process where the habitat was suitable.
2. Birds arrived in a previously unpopulated area, remained and bred. From this nucleus a further ink-blot spread developed.

The banding programme provided some evidence of " ink-blot " spread into newly-created habitat within an area which held a stable population. It is considered that it is the juveniles in category 3 above (" Left the area ") which move out to populate new areas, although there is no evidence to prove this theory. To date the greatest known distance covered by a banded bird from Southland is 12 miles (19.3 km). The Australian long-distance record (Liddy 1969) is 91 miles (145.6 km).

HABITAT

Spur-winged Plovers prefer wet swampy ground with short cover. Scattered rushes and sedges provide a broken pattern background both to the incubating bird and to the chicks. Areas of dense rushes are not used. The birds will use pasture with short cover of up to approximately five inches, cultivated paddocks, grain-crop or hay stubble, new turnip crops and areas left fallow after turnip or choumoellier crops have been eaten down. When birds are found in such areas a further search will usually reveal a nearby wet area with rough cover. Other places used are stony or sandy river-verges and riverbeds, gravel pits, estuaries, and sometimes coastal beaches. In Central Otago birds may be found in overgrown tailings left after gold-dredging, or in other dry stony places with sparse grass cover. In most cases there is water nearby (river, stream or irrigation race) but not always. One pair had a nest at least half a mile from the nearest water. A further requirement appears to be wide uninterrupted visibility. It is unusual to find birds in narrow gullies or valleys with restricted outlook. They will sometimes use undulating slopes. They can be found at high altitudes, where other conditions are suitable (e.g. Caroline 1530′ (465.9 m), Wilkin Valley 2000′ (609.6 m), Mid-Nevis Valley 2200′ (670.6 m)). In summary, the area of choice is wet, rough, with short cover, flat, and has a wide outlook.

COLONISATION IN CERTAIN LOCALITIES

Colonisation and present status in five areas are now described.

Makarora Catchment:

An Internal Affairs Department Field Officer found 2 adults and 3 chicks on 10 November 1952; on 10 March 1953 he saw 3 birds; and on 15 February 1955, 5 birds. On 9 September 1963, Mrs Pennycook of Makarora Station told Mr H. R. McKenzie that up to 9 birds were often on the wet flats below the homestead. In October 1966 Mr Peter Child found 21 birds along 9 miles of river-bed, mostly in pairs. Mr Alan Wright was Internal Affairs Department Field Officer at Haast in 1966, 1967 and 1968. His counts in the Makarora area, covering about 2 miles of road, are as follows: 11 January 1967, 14 (11+3); 17 January 1967, 17 (4+8+2+1+2); 31 May 1967, 28 (2+10+7+9); 11 June 1967, 60 (54+2+4); 22 June 1967, 84 (3+36+4+5+2+34); 28 June 1967, 93 (1+3+3+46+29+11); 2 July 1967, 21; 22 July 1967, 15; 18 August 1967, 49 (45+4). Mr Wright (pers. comm.) said, " Birds were observed in 1966 and 1968 but no details taken. Breeding also took place in 1966, 1967 and 1968, but I would not like to say how many." Mr Child (pers. comm.) found 36+ in one flock on 2 June 1968, and on 23 May 1970, 47+, including 39 at the river delta.

Lillburn Valley:

Mr Bruce Campbell farmed at Lillburn Valley from 1935 until 1971. His farm was bounded by the Lillburn River at its junction with the Waiau River. In 1970 Mr Campbell told me; " Up to 1963 there were only a few Spur-winged Plovers about. They appeared to increase about this time, and since 1963 numbers have been fairly stable, the usual flock size at the river being 15 to 20, and a regular population of pairs about. An exceptional flock of about 50 just below the Lillburn River mouth was counted in 1965. The birds move off from the paddocks in the summer and return again about May."

Lower Clutha and Lake Tuakitoto:

The first record from Lake Tuakitoto was in October 1962, from Mrs L. E. Walker; Mr B. D. Bell saw 4 there in November 1964; Mr H. R. McKenzie recorded about 8 on 5 November 1965; and Mr W. T. Poppelwell noted 9 on 16 March 1968. Mr Bill Jones, farmer of Stirling, told me in June 1969: " Spur-wings first appeared here about 5 years ago. They are getting thick now; always some down by the river and the lake." In a letter dated 5 May 1971, Mrs Jones says: " There are 5 pairs on our farm just now, and we all say there is definitely an increase since 1969."

Upper Clutha River Valley:

Establishment and spread in the Clutha River valley between Island Block and Roxburgh is demonstrated by the following records:

" 1957-63 None seen, although area visited frequently, and lived

in for periods of some weeks at a time during these years." (O. Sansom); July 1964 Millers Flat 3 (D. Kelly); 30 July 1965, Mr A. J. Hodgkin, farmer of Moa Flat, in letter to Mrs J. Hamel: ". . . my first sighting of Spur-winged Plovers, 4 of which flew over the farm from south to north today"; 26 September 1965, Roxburgh East 2 (Richard Gray). There are no further records until 24 March 1967 when I found 13 at Island Block. Subsequent increase in the valley is demonstrated by the further sightings, all by the author unless otherwise acknowledged: 23 April 1967, 15 (9+2+2+2); 5 August 1967, 2+2; 18 November 1967, 1; 24 December 1967, 20, at least 2 of which were juveniles; 12 September 1968, 14 birds, 4 nests; 12 June 1969, 30 (Island Block) +3; 30 August 1969 13 birds, 3 nests; 19 April 1970, 17 (Dumbarton) (C. E. Barlow); 22 March 1971, 8 (M. M. Davis); 20 April 1971, 56 (+1+11 (Dumbarton) +5+2+29 (Island Block) +6).

On 12 September 1968, a drive from Clydevale through Tuapeka Mouth and Beaumont to Roxburgh revealed birds breeding in 7 places. These were nests or broods sighted from the car, and would not be the total population. It is apparent that the valleys formed by the rivers have provided a highway for the dispersal of birds in the region.

Lawrence:

Here the species is at an early stage of colonisation. March 1962: " Heard calling over the town of Lawrence. Reported reliably by a man who apparently knows these birds well in Australia and Tasmania." (R. Nilssen); 28 October 1967, 2 adults (M.L.B.); 26 December 1967, 3 adults, all in moult; 13 September 1968, 2 birds, 1 nest; 6 April 1969, 4 birds; 30 August 1969, 2 birds, 1 nest; 11 May 1970, 3 birds; 21 March 1971, 2 adults, 1 juvenile; 30 August 1971, 3 breeding pairs with nests. The sighting of three moulting adults in December 1967 indicates that these birds did not breed successfully that year. Had they done so the offspring would still have been with the adults (Barlow, Muller & Sutton 1972). But in 1968 the first nest was found and there is evidence of breeding in subsequent years.

Discussion:

The colonisation pattern is demonstrated in the examples cited. Density is influenced by availability of suitable habitat.

A note about flying habits is relevant. From my home in Invercargill I sometimes hear Spur-wings at night, calling from a height as they fly over. This also happens in the daytime, and birds have been seen in twos, threes, fours and singly, flying high and in a direct line. This differs from the flight patterns of birds on their home ground. Breeding birds, once established in an area, remain there or in the close vicinity all the year round.

The composition of the large flocks is not fully known. These flocks occur most often in the autumn, but may be found at any time of the year. The autumn flocks probably include some juveniles of the year. In late autumn the juveniles of neighbouring families mingle, forming small flocks. Adults are also found in these flocks. In the study area where most of the population was banded flocks of up to 15 were seen and the flock composition known. It may be significant that since 1965 no large flocks have been found in the study area, where population numbers are stable and breeding density is probably at optimum levels. Flocks of more than 100 have been seen within ten miles of the study area. The large flocks probably contain numbers of non-breeding birds.

LOCAL MOVEMENT

The local movements of eight breeding birds over three years is shown in Fig. 1. For reasons of clarity only 6 to 8 sightings of each bird are plotted. In fact there were many more, in some cases hundreds, of sightings of the birds in the same locality over the years. The land surrounding the area shown in Fig. 1 was under close scrutiny throughout the years of the study, and had these birds moved further afield they would probably have been sighted at one time or another. The adult birds could always be found in the breeding area during the 9 to 10 months occupied by the breeding period and post-fledging period of dependence of the brood. In the remaining two to three months they could often be seen in their usual haunts; if not immediately found, a vigilant search would usually be successful.

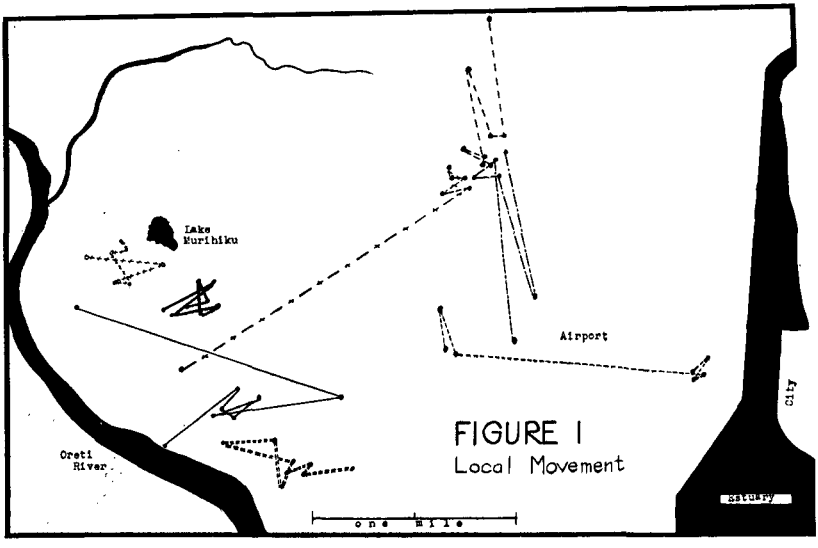

FIGURE 1: Local movement of 8 breeding Spur-winged Plovers over 3 years.

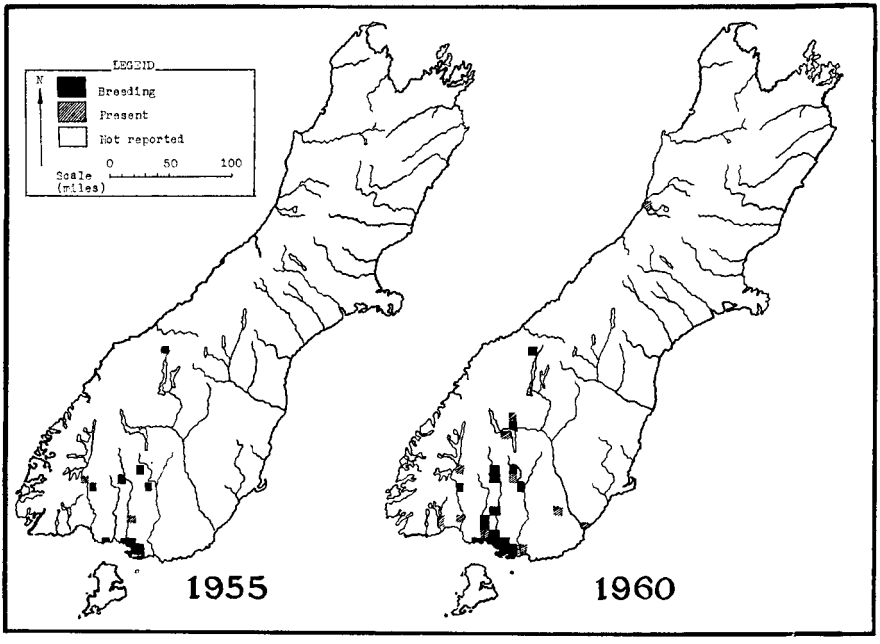

FIGURE 2A: Distribution and status of the Spur-winged Plover at 5 year intervals; 1955, 1960.

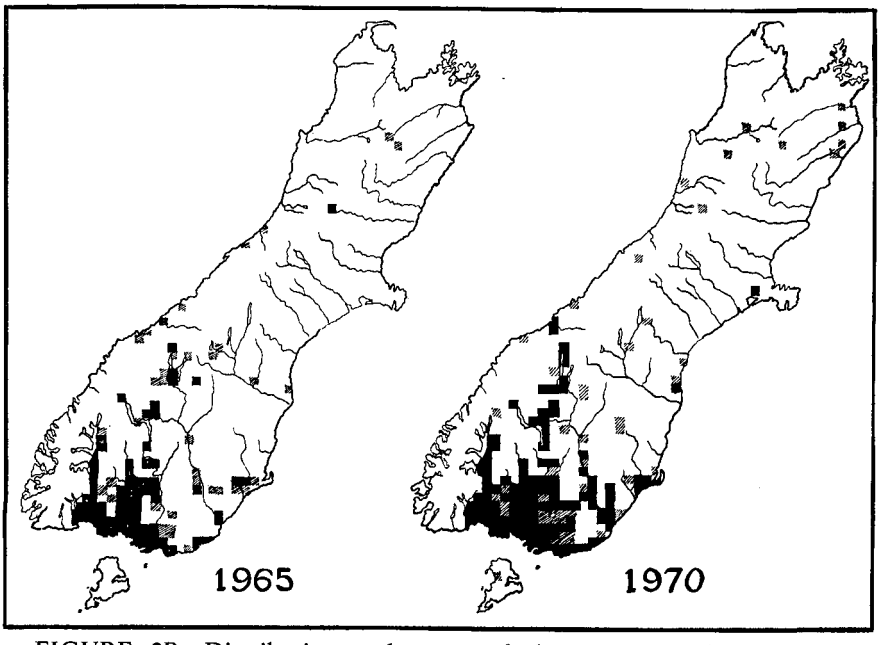

FIGURE 2B: Distribution and status of the Spur-winged Plover at 5 year intervals; 1965, 1970.

LOCALITY REPORTS

The distribution and status of the species at five year intervals from 1955 to 1970 is indicated in Figs. 2A and 2B, based on material from the OSNZ Recording Scheme, and on reports made to me and since lodged with the Scheme.

Most of the following locality reports are the first recorded sightings in the area. Later sightings, where included, give an indication of increase in the particular area. The Letter B indicates evidence of breeding, either nest or chicks having been seen. The number is the number of fledged birds; chick numbers are not included. Bracketted names are those of the people who supplied the information and initials indicate that the reporter's name has previously been listed. Records marked with an asterisk are considered to be vagrant birds. In the years prior to 1951 Spur-winged Plovers, usually single birds, appeared as vagrants in different parts of the country (Oliver 1955).

1951 Five Rivers 2B (I. Drummond).

1952 Makarora 2B (Field Officer); Waiau River just below Manapouri 4 (W. Macdonald).

1954 Manapouri airstrip 5 (Field Officer).

1955 Redcliffs 2B (B. Ellis); Lumsden (M. F. Soper); Colac Bay 2B (Mrs Stick).

1956 Waiwera 4 (O. Sansom); 10 miles south of Te Anau 2 (Mrs Nan Smith); One Tree Point (OS); Colac Bay 6B (Mrs Stick); Pahia 4 (W. Molloy); Thornbury B (R. M. Royds); Lower Mataura River (S. L. Lobb); Lake east end (L. Young); *Lake Ryan Cobden West Coast Acclimatisation Society Game Farm: 3 stayed two seasons (1956/57).

1957 Mossburn (M. Small); Lake Hayes 3 (MFS); Lake Hawkins Invercargill 43 (G. I. Moffett); Gummies Bush 2 (A. Thomson); Winton 8 B (H. Smith); Scott's Gap 4B (Mrs Gay); Dunearn/Aparima: Many birds in this area B (N. F. Sansom).

1958 Queenstown 2B (MFS); Inchclutha (I. McLaren); *Matata, Bay of Plenty 1 (R. T. Adams).

1959 Gorge Road 8 (SLL).

1960 Gorge Road 21 (SLL); Remarkables Station, Queenstown (Jardine).

1961 Routeburn Station c.12 (R. H. Bryant); Mt Aspiring Station 2 (P. Child); Te Anau 17 (B. D. Heather).

1962 Mararoa Station 6 (BDH); Matukituki River (PC); Remarkables Station, Queenstown B (Jardine); Lower Shotover 2 (Hansen); Lindis Valley, 12 miles above Tarras "said to be first seen" (PC); Heriot B (Mrs L. E. Walker); Lawrence 1 calling (R. Nilssen); Lake Tuakitoto (LEW); Tokoiti (J. Hamel); Outram 2; Ahuriri 2 (B. D. Bell); Ohau 2 (BDB); Hakataramea 8 (BDB).

1963 Te Anau B (MFS); Oreti Valley above Mossburn c.40 (W. T. Poppelwell); " Very common throughout open country of Southland. Common Te Anau district and Waiau Valley west to Fiordland bush edge. Main centre of population still Invercargill airport region. Densest population in coastal strip near Invercargill. Inland are scattered, especially alongside riverbeds, but by no means entirely " (BDH); Queenstown 4 breeding pairs (MFS); Routeburn Station c.12 (RHB); Lindis Valley Geordie Hill Station 2B (PC); Pomahaka 1 (RN); Haast 7, Arawhata 2 and Hunter (several) Riverbeds (Graham Adams told PC first seen here 1963); 2 miles south of Franz Joseph Glacier c.12, moved on (D. Panckhurst); Upper Waitaha Valley 4 in May, not present November (A. B. Munden); Kokatahi 2, moved on (M. Wallace); Lake Sumner B (K. Rowe); St. Helen's Station, headwaters of Wairau, reported present (KR).

1964 *Southland:* Otautau 28 (MLB); Balfour 7 (P. Ryan); McNab 4 (WTP); Eglington Valley 2 (Parks Board Instructor).
Otago: Increasing slowly and in small numbers in Otago; breeding; none in Alexandra basin so far (PC); Waipahi 2 (LEW); Momona 3 (LEW); Hindon 2 (D. Kelly); Taieri Mouth 2 (WTP); Outram 5B (H. W. M. Hogg and G. Grant); Toko Mouth 5 (DK); Millers Flat 3 (DK); Lake Wanaka 60+ 26/7/64 (PC); Shovel Flat, upper West Matukituki Valley 2 (PC); Phoebe's Creek, Lower Matukituki 2 (PC); " Not in Oamaru District " (A. Nuttall).
Westland: Kokatahi 5 (E. W. Crack).

1965 *Southland:* Waimatuku 46 (MLB); Riversdale/Lumsden 50+ Many in small flocks (RN).
Otago: Tapanui a few (MFS); Moa Flat 4 flew over (AJH); Roxburgh East 2 (R. Gray); Alexandra 2 (PC); North Taieri 2 arrived mid-July, B 12 August 1965 (D. Ross); Remarkables Station, Queenstown 10/12 (Jardine);Queenstown/Arrowtown 20+ pairs (excluding Jardine's) (MFS); Fairlight 20 (GG); Lower Shotover 2B (Hensen); Ewings Flat, Wanaka 1 August 1965, 50-60 (PC); Ewings Flat, Wanaka May 1965 96 (H. Tanfield); Clutha River: " Not reliably reported further down river than Tarras. No new areas noted 1965 " (PC); (Note: except Alexandra 10 December 1965).
Canterbury: Studholme 2 (H. R. McKenzie).
Marlborough: Rainbow Station, St. Arnaud, upper reaches of Wairau River 2 (J. Cowie).

1966 *Otago:* Waipahi 4 (WTP); Lowburn Ferry, Cromwell 2 (OS); Naseby-Kyeburn Road 8 (WTP); 12 June 1966, Matukituki River Mouth 38 + 40 (PC).
Canterbury: Washdyke Lagoon, Timaru 5/6 (moved on) (B. R. Keeley).
Marlborough: Near Seddon 2 (OS).
Westland: Poerua 2 (R. A. Webber).

1967 Mason Bay, Stewart Island 2 (MLB).
Otago: "Becoming more plentiful and widespread" (WTP); Hooper's Inlet 1B (WTP); Otanemomo 1 (WTP); Owaka 1 (WTP); Wakatipu area: Rees Valley 25 in 8 miles; Dart Valley 20 in 11 miles; great increase in last three years (PC); Upper Manukerikia 11 + 3 B (PC).
Haast: Autumn, c. 60 (AW).
Canterbury: 3 miles up Tekapo River from confluence of Pukaki and Tekapo Rivers 2 (R. Hosken); Lake Ellesmere 12 (G. A. Tunnicliffe).
Marlborough: Ure River 1 (J. Taylor).
Manawatu: *Lake Horowhenua 1 (E. B. Jones); *Hokio Beach 2 (EBJ).

1968 *Otago:* Fruitlands 2 (WTP); Lower Lindis, Cluden-Clutha 7 in 12 miles (PC); Lake Howden 2 (D. A. Lawrie); Henley c. 20 (JAC).
Canterbury: Otaio River 5 (R. J. Pierce); Lake Wainono 6 (RJP); Lake Tekapo 2 (RJP).
Westland: *Barrytown (T. Hartley-Smith).
Marlborough: Blenheim 1 (JAC).

1969 *Otago:* Kokonga, Central Otago 4B (T. J. Taylor).
Mid-Nevis Valley 6B (PC).
Westland: Franz Joseph 4 (PC).
Canterbury: Lake Wainono 4 (RJP); Lake Ellesmere B (M. M. Davis); Lake Tekapo 2 (RJP).
Marlborough: Near Murchison 1 (F. C. Kinsky).
Nelson: Near Warwick Junction 2 (S. C. Sparrow).
Wellington: *Waimeha Lagoon, Waikanae (R. B. Sibson).

1970 *Otago:* Matukituki River Mouth 80+ (30 January 1970) (PC); Howe 5 (WTP); Wilkin Valley 2000′ a.s.l. 2 (PC).
Canterbury: Harihari 2 (JRJ); Lake Wainono 2-8 present throughout year; breeding suspected (RJP).
Marlborough: Ure River 1 (JC).

1971 Fox Glacier 4 (MLB).
Stewart Island: Horseshoe Bay 2; Lonneker's Bay 2 (OS).

DISCUSSION

It is considered that the 1932 arrivals in Southland were a pair which by chance found themselves in a vacant niche where breeding conditions were ideal. These birds formed the nucleus of the present population. Some wind-assisted Spur-winged Plovers have probably reached Southland since 1932. Vagrants of other Australian species have done so, and there is no reason to doubt that further Spur-winged Plovers have also arrived. Any such birds would soon find others of their species and would swell the numbers to a small extent.

It is possible that the 1952 birds in the Makarora area were wind-blown from the west. Had they originated from the Southland stock they would have by-passed many suitable breeding areas en route, and it seems more reasonable to suppose that they were wind-blown vagrants.

The main cause of population increase however is considered to be the high rate of natural increase in the optimum breeding areas (Barlow, Muller & Sutton 1972).

The Southland/Otago colonisation continues. More distant areas where breeding is occurring are Lakes Wainono and Ellesmere in Canterbury, and there is good reason to believe that in the ensuing years birds in these areas will increase and disperse in the pattern described.

ACKNOWLEDGEMENTS

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