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DISTRIBUTION OF BLUE DUCK IN NEW ZEALAND FROM 1980-1991

by

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CONTENTS

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ABSTRACT

This report provides a listing of sightings of Blue Duck (*Hymenolaimus malacorhynchos*) in New Zealand from 1980-1991. Distribution is presented as presence in 10,000 yard grid squares. The distribution of Blue Duck is presently more extensive than indicated in previous surveys.

1 INTRODUCTION

New Zealand's Blue Duck (*Hymenolaimus malacorhynchos*) is adapted to year-round life on fast-flowing waterways in unmodified hilly country (Kear 1972). As a river specialist, the bird is dependant on unmodified, unpolluted waterways carrying minimum sediment load.

Blue Ducks were once distributed throughout forested mountain ranges in both islands (Williams 1964) and it is widely accepted that they have declined both in numbers and distribution (Mills and Williams 1978). The conservation status of Blue Duck is now regarded as "threatened" (Bell 1986), with knowledge of distribution based on surveys published by Fordyce (1976), and the Ornithological Society of New Zealand in 1978 and in 1985 (Bull *et al.*, 1978 and 1985). These surveys revealed a very patchy distribution of widely separated, remnant populations, a feature characteristic of populations in decline. However, a number of unpublished and verbal reports indicated that there were major gaps in the information and that a long-term, intensive survey was needed to determine national, present-day (1980s) distribution.

The objectives of this survey were:

1. To determine present day (1980s) distribution from which future assessments of status can be made.

2. To record these data on computer database for ongoing management and research use.

2 METHODS

Sightings of Blue Duck were reported by members of a variety of outdoor recreation groups (mainly trampers, climbers and hunters) from March 1983 onwards. Articles

placed in the Federated Mountain Clubs Bulletin and the newsletter of the Ornithological Society of New Zealand were the main ways by which the survey was promoted.

Surveys were carried out on a local scale by the NZ Wildlife Service prior to its integration with the new Department of Conservation in April 1987. Information was also gathered from the Department of Lands and Survey and the NZ Forest Service. Since April 1987 DoC staff have collected many more records.

Where possible, specific surveys were carried out early or late in the day when Blue Duck feeding is at its peak (Veltman and Williams 1990) and the birds are most conspicuous. The use of dogs on surveys in recent years has shown that Blue Ducks use daytime hiding places to a much greater extent than previously suspected. Birds have been located in log-jams, rock-tumbles, under-cut banks, caves, and dense riparian vegetation. Other signs such as concentrations of faeces on emergent rocks (Williams 1979), or collections of moult feathers are proving to be reliable indicators of Blue Duck presence.

Sightings were translated into map-based data (both NZMS 1 imperial and NZMS 260 metric series), and entered into a computer-based database. Where sufficient detail was available, positions of sightings were plotted to eight digit (imperial) and 10 digit (metric) map references.

To facilitate direct comparison with the distribution figures published by the OSNZ (Bull et al. 1985), computer plots were produced from the imperial data to show presence of Blue Duck in 10,000 yard grid squares for each island.

3 RESULTS

3.1 Numbers of records

Preliminary results (Williams 1988a) and in Cunningham (1989) were from a database with only 1600 and 2000 records respectively, and included 128 pre-1980 records. The database now holds over 3,300 records covering 11 breeding seasons from January 1980 to February 1991. Many are repeat sightings from popular tramping routes and hunting areas.

These data are listed in Appendices 1 (North Island) and 2 (South Island). Map reference fields (columns) headed with an "IMP" prefix show imperial map references whilst a "MET" prefix is used for metric references. In each case the whole grid reference is given. A "standard" six-digit grid reference can be easily determined by using the last three digits of each easting (E1, E2) and northing (N1, N2). A second set of eastings and northings (E2 and N2) are given where a stretch of river was traversed and a number of birds seen. "STREAM" is used as a general term for any tributary of a catchment in which birds were recorded. Fields headed "AD", "JUV", and "TOT" show numbers of adults, juveniles, and total respectively.

Table 1 shows the number of records obtained in each year of the survey. The increase in the numbers of records from 1988 is attributed to the formation of Department of Conservation which brought together a well co-ordinated and highly motivated, national group of Conservation staff. The formation of a Blue Duck Liaison Group and production of a Conservation Strategy (Williams 1988b) has had a major influence on the national awareness of Blue Duck.

Table 1: Numbers of records of Blue Duck sightings 1 January 1980-28 February 1991

Year	North Is.	South Is.	Total	(%)
1980	18	27	45	(1.4)
1981	60	41	101	(3.0)
1982	171	48	219	(6.5)
1983	164	130	294	(8.8)
1984	137	163	300	(8.9)
1985	94	199	293	(8.7)
1986	76	118	194	(5.8)
1987	55	131	186	(5.5)
1988	144	215	359	(10.7)
1989	343	312	655	(19.5)
1990	250	384	634	(18.9)
1991	22	52	74	(2.2)
TOTAL	1534	1820	3354[1]	(99.9)

1. Excludes fifteen 1980s records with no date

3.2 Distribution of records

Figures 1 and 2 illustrate the distribution of Blue Ducks by showing presence in 10,000 yard grid squares. Squares for which multiple records were obtained are illustrated as solid circles. Open circles are used where presence is represented by a single record, and most of these occur at the edges of populations where the habitat may be subject to greater disturbance. These illustrations are **not** a representation of Blue Duck numbers or population density, they simply record presence.

The North Island land area of 114,453 km^2 (Dept of Lands and Survey 1978) is divided into 1,369 grid squares and Blue Ducks occur in 214 (15.6%) of them. Similarly, Blue Ducks are present in 324 (18.0%) of the South Island's 1,803 grid squares (in 150,718 km^2. Single sightings occurred in 26 (12.1%) of North Island and 57 (17.7%) of South Island grid squares.

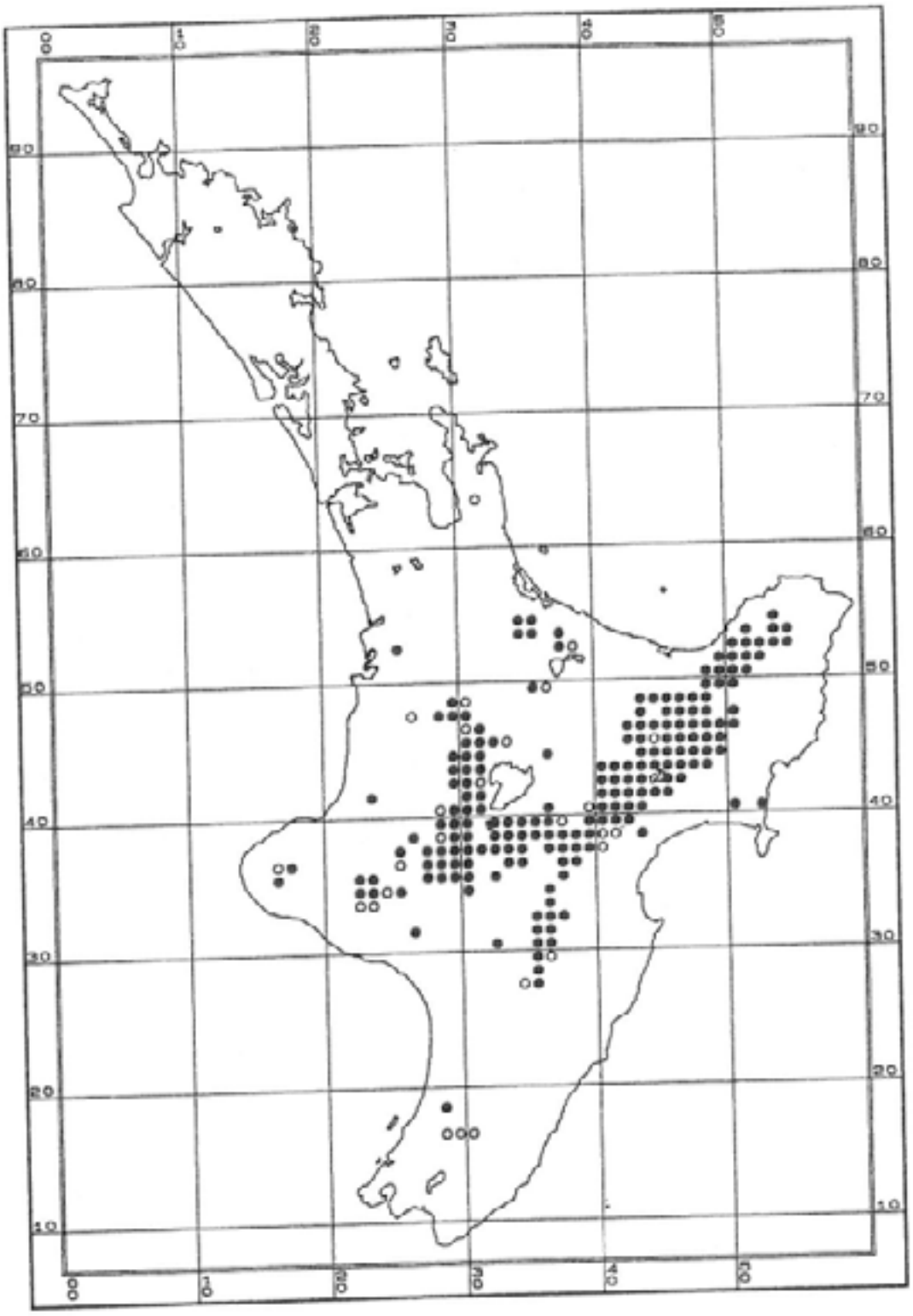

Fig. 1 Presence of Blue Duck in 10,000 yard grid squares in the North Island, 1980-91.

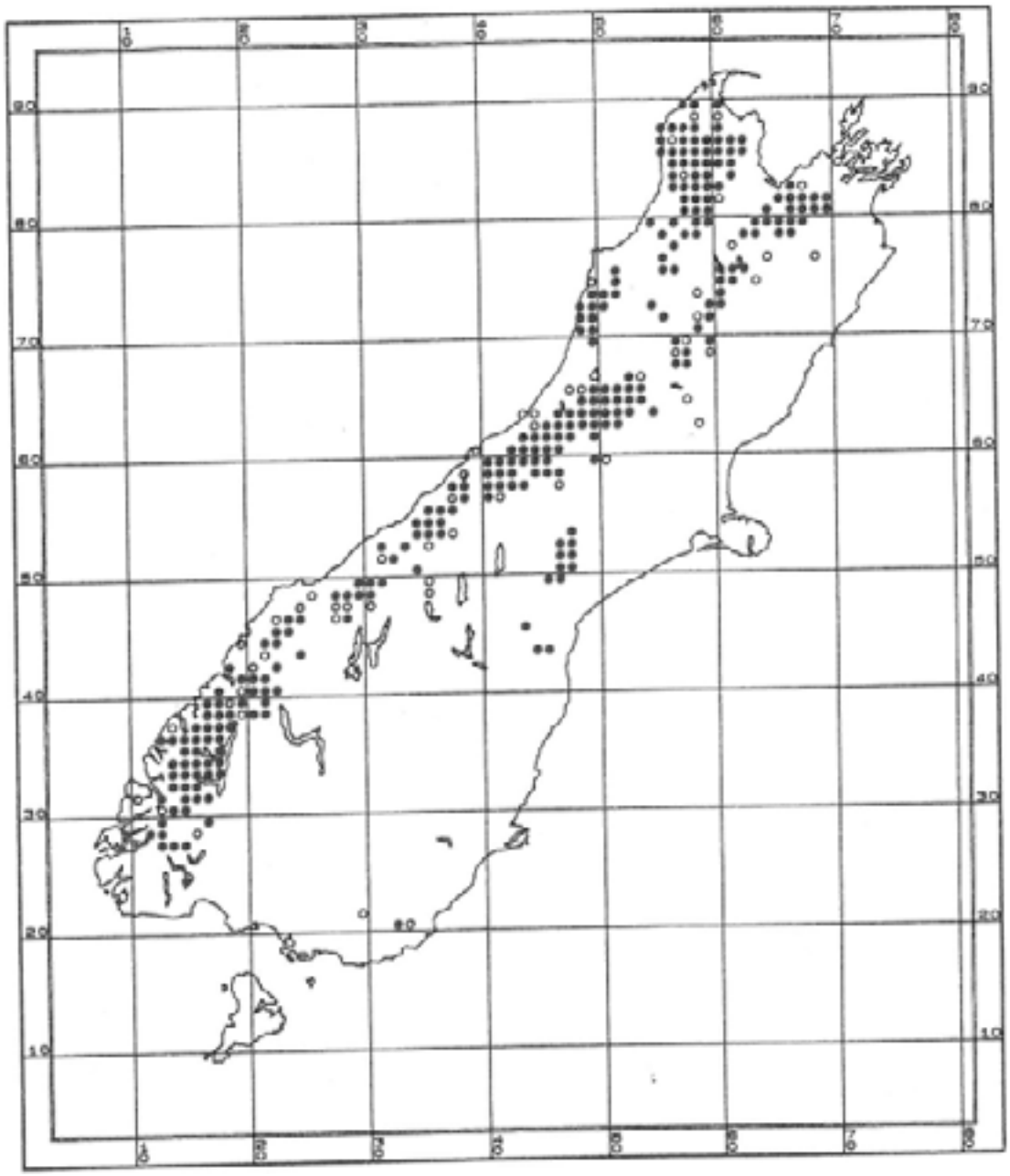

Fig. 2 Presence of Blue Duck in 10,000 yard grid squares in the South Island, 1980-91.

3.3 Increase in distribution in relation to effort

An analysis of the numbers of new 10,000 yard grid squares (used here as a constant, and objective, expression of new location) for each year shows a marked variability between years (Table 2). If the numbers of new squares (a measure of reward) for each island are plotted against the numbers of sightings (the only available measure of effort in this survey), the result is an observation-area curve (Fig. 3) adapted from Odum and Kuenzler (1955).

Table 2: Numbers of new 10,000 yard grid squares in each year in each island.

Year	North Is.	South Is.	Total	(%)
1980	12	23	35	(6.5)
1981	32	21	53	(9.9)
1982	55	30	85	(15.8)
1983	32	50	82	(15.2)
1984	19	40	59	(11.0)
1985	11	37	48	(8.9)
1986	8	19	27	(5.0)
1987	7	19	26	(4.8)
1988	15	28	43	(8.0)
1989	16	21	37	(6.9)
1990	5	30	35	(6.5)
1991	2	6	8	(1.5)
TOTAL	214	324	538	(100.0)

As all surveys are governed by the law of diminishing returns the question that must inevitably arise is: at what point do we decide that the coverage is enough? Before we can answer that, we must have a very clear idea of the conservation values of the subject and what proportion of the population we need to know about.

Clearly, if the species has a high conservation value, then we do need as complete as possible an understanding of its distribution. Getting the last say 5% of locations in its range may take as much effort as the previous 95%. In this survey we can use the observation-area curves in Figure 3 to calculate rates of increase of new locations in each island from the smoothed curves. Odum and Kuenzler suggest that an increase of less than 1% represents the point of diminishing returns, beyond which the returns are not worth the invested effort.

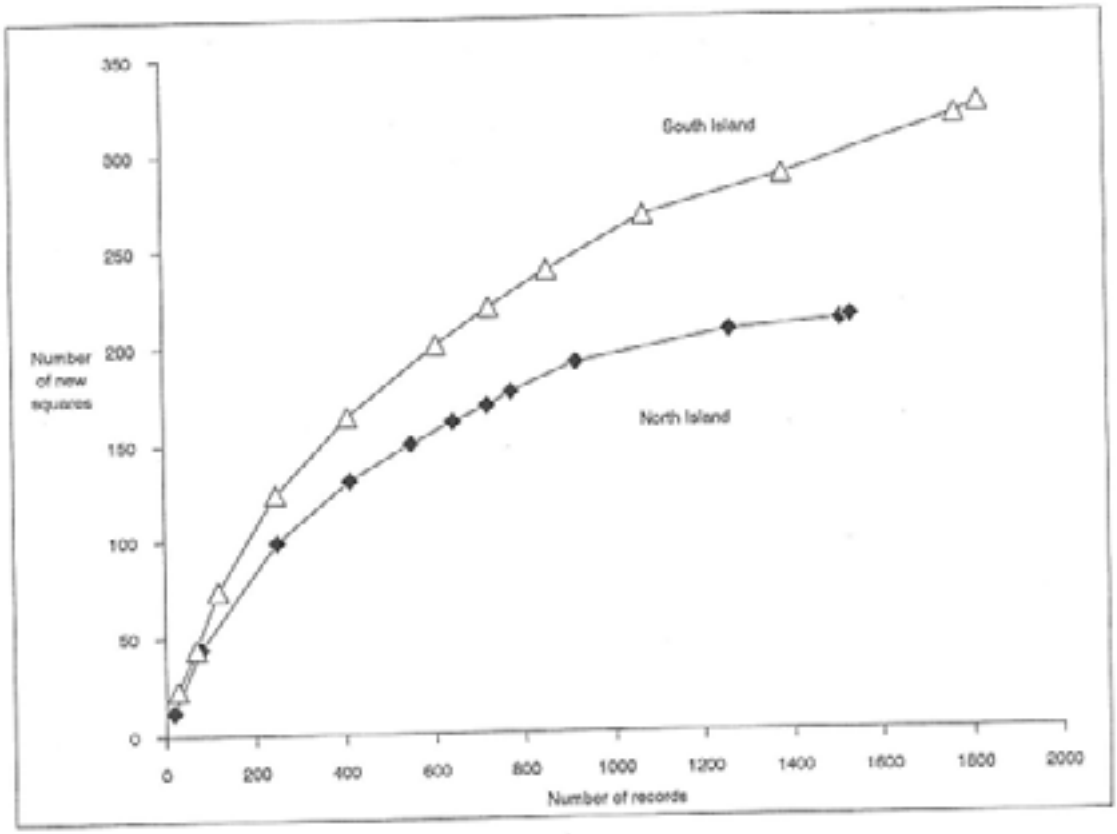

Fig. 3 Rate of discovery of new 10,000 yard grid squares

To determine the rate of discovery of new locations, I have arbitrarily chosen a figure of 100 additional sightings as a practical measure of effort. The North Island's curve is approaching asymptote and in the last 100 records, increase in new squares is down to 1.9%. In addition, the flatness of the curve at its end-point suggests that this figure will decline to the 1.0% level quite soon. Beyond that point, new sightings are unlikely to add significantly to the overall knowledge of Blue Duck distribution in the North Island. New squares are still increasing in the South Island at the rate of 3.2% but the curve is still quite steep compared with that for the North Island so the decline to the 1.0% level will take longer. It suggests that there may be parts of the South Island from which Blue Ducks have not yet been reported. This is not surprising given the remoteness and difficult access of much of the South Island's hill and mountain country.

The observation-area curves make it clear that our knowledge of Blue Duck 1980s distribution in the North Island is as close to complete as it is likely to be. However, there is clearly some way to go before we can be sure of complete coverage in the South Island.

4 CONCLUSIONS

- The results show that Blue Duck distribution is much more extensive than previous surveys have indicated. New locality records have extended the edges of the population cores. In some cases this has revealed contiguity between hitherto isolated populations. Small, isolated groups have been located which were not previously recorded. The extensiveness of the survey has also revealed gaps in the distribution, many in apparently suitable habitat. These are puzzles which need explanation.

- The figures clearly demonstrate that firstly, short-term and one-off national surveys of species distribution will not adequately cover the full geographic range. Curtailing the time or extent of a survey for the sake of expediency may result in missing a crucial population with negative consequences for its conservation. Secondly, that we can now afford a slight shift in our focus away from intensive survey of Blue Duck to population monitoring, particularly in the North Island. We really do not know whether Blue Duck are still declining. And thirdly, that continuous analysis of the rewards for our efforts **during** a survey will be a more efficient way of determining its effectiveness than carrying out the analysis at what we think should be the end.

- Availability of internal resources need not be a hindrance to either surveying or monitoring as, as this survey has shown, there is a great deal of willingness by the recreating public to participate in an identifiable and enjoyable conservation activity. Time invested in raising public awareness and encouraging their participation in chance-encounter surveys will allow conservation managers to use resources more effectively and cultivate a closer relationship with the public.

- The database now provides conservation managers and researchers with readily accessible and useful data on not only where Blue Duck live, but also where they are absent and may be re-established. It also provides managers with a benchmark against which future changes in the bird's distribution can be measured.

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