

The numbers of Auckland Island Teal

MURRAY WILLIAMS

Introduction

Three sub-species of *Anas aucklandica* are recognised (Kinsky 1970); *chlorotis*, the Brown Teal which has a restricted range on the New Zealand mainland and a few islands in Hauraki Gulf (Hayes & Williams 1982; see also Dumbell 1986); *nesiotis*, the flightless Campbell Island Teal now restricted to Dent Island off the western side of Campbell Island (Robertson 1976); and *aucklandica*, the flightless Auckland Island Teal from Auckland Islands.

Expeditions to Auckland Islands (e.g. Yaldwyn 1975; Falla *et al.* 1979) have recorded Teal on most of the smaller islands of the group namely, Rose, Ocean, Ewing,

Enderby, Dundas, Adams and Disappointment (Fig. 1) but the bird was last seen on Auckland Island itself in 1942 (C. A. Fleming, pers. comm.). Estimates of their abundance have ranged from "at least 500" (Falla 1975) to 1200–1500 (Kear & Williams 1978). However, apart from Weller's (1975) survey on Ewing Island, where he estimated the population to be 56 birds, no specific surveys to determine Teal abundance have been undertaken. I visited four islands in the Port Ross area of Auckland Islands to commence such a survey which, in time, is intended to cover all of the small islands of the Auckland group, and selected localities on Auckland Island.

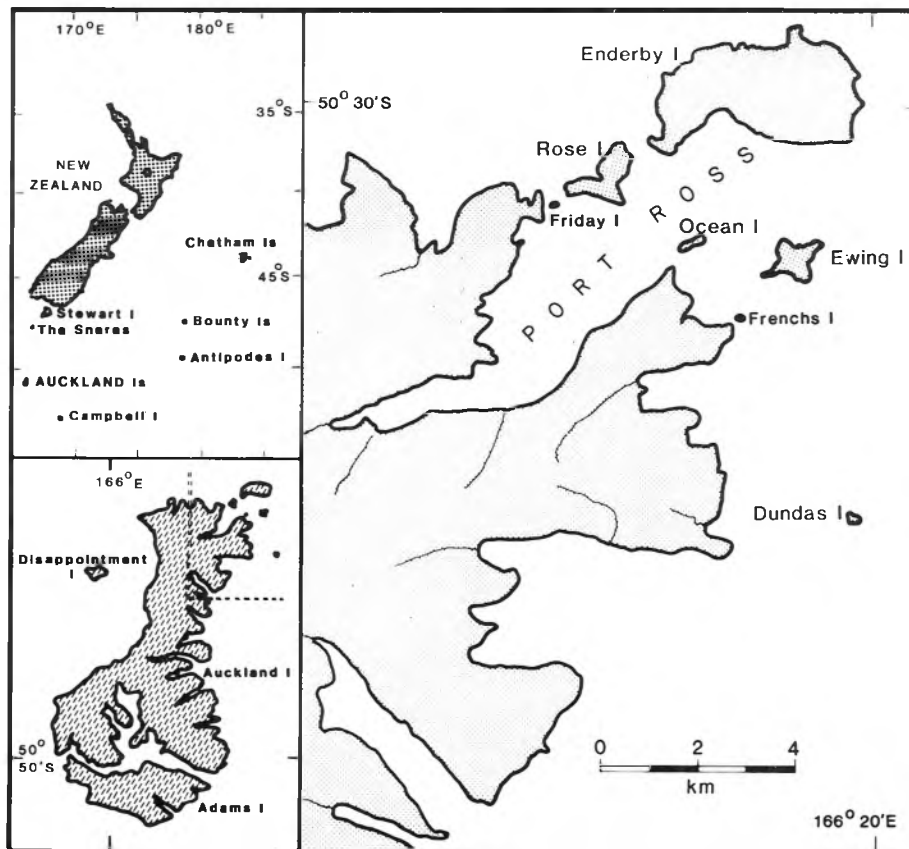


Figure 1. Location map, the Auckland Islands, and detail of the Port Ross area.

Methods

The islands were visited as follows:

Rose Island	25–28 February, 12 March 1982; 7–10 April 1983
Ocean Island	13–16 March 1982
Ewing Island	5–9 March 1982; 2–6 April 1983
Enderby Island	24–25 February, 1–4 March 1982; 8–10 April 1983

On each island birds were caught in handnets at night. All birds were banded with stainless steel leg bands; in 1982 birds were banded also with coloured plastic bands to indicate the night of initial capture; in 1983 all birds were banded with a two-colour combination to confer individual identification.

Survey procedures on Ewing Island involved two consecutive nights of capture, banding and release, a night of no disturbance, followed by a night of recapture. The latter involved both physical recapture and the sighting of marked and unmarked birds. The capture-recapture programme was restricted to that part of the island where Teal were most frequently seen.

A single night-time survey of the island's entire coastline was also conducted, the number of birds encountered was then compared with the maximum number of birds encountered in the intensive study area, and an estimate made of the island's population.

On Rose Island in 1982, the survey procedure involved three consecutive nights of capture, banding and release, followed by a 13-night interval before recapture was attempted.

In 1983, two nights of capture and banding were followed immediately by a third night of recapture.

On Enderby Island, the birds were dispersed mainly along water-courses thus making a capture-recapture programme inappropriate; counts were made of birds seen on streams during the day and on the coastal wave platforms at night.

No birds were caught on Ocean Island; note was taken of the locations at which birds were seen and numbers deduced from these sightings.

Auckland Island Teal are mainly crepuscular. Although some birds were encountered on all islands during daylight, greatest numbers were observed at dusk and during the initial three-four hours of dark-

ness. The capture-recapture activities commenced when it was dark enough for Teal to be dazzled by strong torch-light. Daytime surveys, as on Enderby Island, were restricted to areas within the rata *Metrosideros umbellata* forest or amongst vegetation where Teal, secure from aerial predation by Southern Skuas *Stercorarius skua lonnbergi*, were active and readily seen.

Data derived from the capture-recapture procedure conducted on Rose and Ewing Islands have been analysed using the standard Petersen estimate (Lincoln index) corrected for small samples as suggested by Bailey (1951). A weighted mean version of the Petersen estimate allowed data collected over several days to be used (Begon 1979). Because of the short interval between successive captures it is assumed that no losses from the population occurred. Some unfledged ducklings were still with their parents in 1982; the youngest seen was at least half-grown and the period of highest duckling mortality was probably well past. No unfledged ducklings were seen in 1983.

Results

Rose Island

The 1982 survey was confined to the island's eastern coastline (cliffs along the western and northern shorelines contain no suitable habitat); in 1983 the census covered the eastern and southern coasts. Data from the two surveys are presented in Table 1 so as to allow direct comparison between them.

In 1982, eight birds were captured and banded over three days of capture and a fourth of recapture. This permitted four estimates using the modified Petersen estimate and a single weighted mean estimate (Table 1). The greatest number seen and/or caught on one night was seven, one of which was banded; at this time the population contained three other banded birds giving a minimum number of 10 birds present.

In 1983 the number seen and captured in the area surveyed in 1982 was considerably higher; on the third night, 16 birds were caught of which five were banded but the population contained another nine banded birds giving a minimum number of 25 birds in the area.

Over the entire island, the minimum

Table 1. Numbers of Auckland Island Teal caught, marked and released on Rose Island in February/March 1982 and April 1983, and estimates of their abundance.

	1982					1983*			1983	
	25 Feb	26 Feb	27 Feb	12 Mar	8 Apr	9 Apr	10 Apr	8 Apr	9 Apr	10 Apr
Total seen and/or caught	6	7	3	4	7	12	16	10	18	21
No. unmarked	6	6	2	1	7	10	11	10	14	14
No. previously marked										
– on day 1		1	0	2		2	0		4	1
– on day 2			1	1			5			6
– on day 3				0						
No. new marks released	4	3	1		7	7		10	10	
Total marks released	4	4	2		7	9		10	14	
Total marked in population	4	7	8		7	14		10	20	
Petersen estimates ($\pm$ 95% confidence interval)										
– day 1–2			16 $\pm$ 15.7			30.3 $\pm$ 26.1			38.0 $\pm$ 26.1	
– day (1+2)–3			14 $\pm$ 11.2			39.7 $\pm$ 23.6			55.0 $\pm$ 28.7	
– day 2–3			8 $\pm$ 6.4			25.5 $\pm$ 15.2			44.0 $\pm$ 25.2	
– day (1+2+3)–4			10 $\pm$ 3.9							
weighted mean			13.5 $\pm$ 13.2			38.5 $\pm$ 29.8			50.0 $\pm$ 31.1	

*data from the same area as surveyed in 1982

number, estimated from the captures of the third night was 36. This figure included two birds banded in 1982, seen on the first night, but not subsequently.

Ocean Island

Three nights and four full days were spent on this small (approx 3 ha) island. Vertical cliffs flank most of the island's perimeter and the wave platform beneath the cliffs is mostly less than 5 m wide. No birds were seen on these wave platforms during daylight or dark nor were Teal seen in the water adjacent to them.

At the island's south-western corner a small boulder beach strewn with seaweed occurs and it was here that three pairs of Teal, one with two half-grown ducklings, were seen at the same relative locations on each night. This beach was watched for four hours from dusk on one evening, and for two hours on another but no more than these three pairs of Teal were observed.

During daytime searches of the island, Teal were flushed on two occasions from beneath *Stilbocarpa polaris* located close to the beach.

The population on this island is obviously small; its minimum size is eight but if as on Ewing Island the number seen represents 40–70% of the total population then the number of Teal on Ocean Island may be 12–20.

Ewing Island

Movement about this entirely forested island was be-devilled by the sprawling growth habit of *Olearia lyalli*, which in many places reached to the water or cliff edge. Such a tangle of vegetation made pursuit of teal very unrewarding and it was decided to concentrate the capture-recapture survey in that part of the western coast where an open shoreline made the task easier. This area, Boat Bay, was where most birds were regularly seen (Fig. 2).

The intensive survey area in 1983 was larger than that in 1982; an additional section of sandy beach on the southern coast (Fig. 2, B to C) was included because birds were commonly seen there. Data in Table 2 are presented so that the two year's results may be compared. However the survey of the entire island was conducted in the same way in both years as was the capture-recapture programme.

In 1982, 21 birds were banded. The greatest number of birds seen in one evening was 28, of which six were banded; at that time the population contained 17 marked birds giving a minimum number of 39 birds in the study area.

In 1983, 23 birds were banded in the area surveyed the previous year; data from 5 April (Table 2) indicate that the minimum number present was 39. Over the entire intensive survey region, 35 Teal were

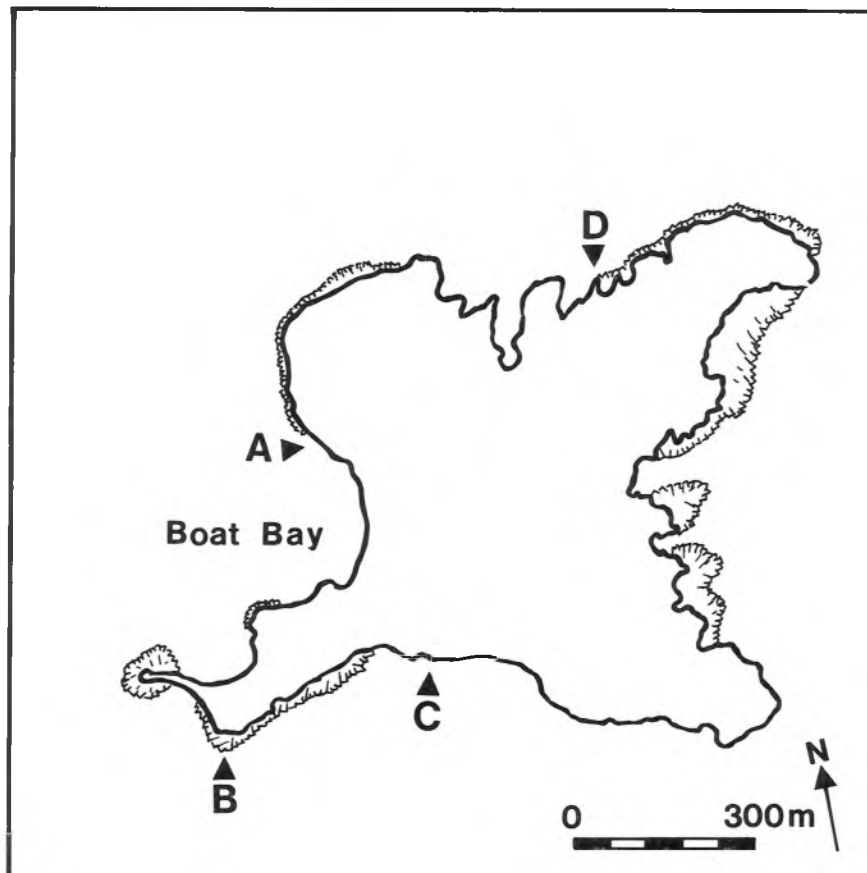


Figure 2. Ewing Island showing the intensive survey areas of 1982 (A–B) and 1983 (A–C). The short section of northern coastline (A–D) is edged with cliffs and was not included in the coastline survey in either year.

Table 2. Numbers of Auckland Island Teal caught, marked and released in the intensively studied area on the western coast of Ewing Island in March 1982 and April 1983, and estimates of their abundance.

	1982			1983*			1983		
	5 Mar	6 Mar	8 Mar	2 Apr	3 Apr	5 Apr	2 Apr	3 Apr	5 Apr
Total caught and/or seen	17	28	12	27	25	27	32	38	31
No. unmarked	17	22	8	27	19	16	32	32	19
No. previously marked									
– on day 1		6	1		6	1		6	1
– on day 2			2			7			8
– on day 1 & 2			1			3			3
No. new marks released	17	4		14	9		15	20	
Total marks released	17	10		14	15		15	26	
Total marked in population	17	21		14	23		15	35	
Petersen estimates ($\pm$ 95% confidence interval)									
– day 1–2		70.4 $\pm$ 42.5			52.0 $\pm$ 30.8			83.6 $\pm$ 52.5	
– day (1+2)–3		54.6 $\pm$ 34.3			53.7 $\pm$ 22.1			86.2 $\pm$ 34.8	
– day 2–3		32.5 $\pm$ 23.7			38.2 $\pm$ 16.8			69.3 $\pm$ 29.0	
weighted mean		66.2 $\pm$ 42.5			53.9 $\pm$ 26.2			87.1 $\pm$ 41.2	

*data from the same area as surveyed in 1982

banded and data from 5 April (Table 2) indicate that at least 54 birds were present.

During the first three hours of darkness on 7 March 1982 the island's coastline beyond the intensive study area (Fig. 2, region B to D) was walked and 50 Teal encountered. On the previous night there were at least 39 Teal in the intensive study area 28 (72%) of which were seen; if a similar ratio of birds seen to birds present holds for the remainder of the island's coastline, then the 50 Teal seen about the coast may represent 70 birds giving an estimate of 109 on the island. If the weighted mean estimate of 66 birds in the intensive area is used in this calculation possibly 118 birds reside about the coasts and a total of 184 on the island.

A repeat of this island survey on 4 April 1983 recorded 19 birds beyond the intensive study area (Fig. 2, C to D). Using the minimum figure of 54 birds in the intensive study area (Table 2) and 38 (70%) being seen on one night, these 19 teal may represent 27 birds, giving an estimate of 81 for the island. If the weighted mean estimate of 87 in the intensive study area is used in the calculation, 44 birds may reside about the coastline and 131 on the island.

Enderby Island

Although boulder- and sand-covered beaches occur along the eastern and southern coasts of Enderby Island, the adjacent intensively-grazed sward lacked suitable escape cover for Teal with the result that Teal were, in the main, dispersed along water-courses or on small lakes. A capture-recapture approach to estimating numbers, therefore, was unsuitable. In 1982, five days and evenings were spent walking the streams of the island and investigating the three small lakes and their swampy margins, and some of the shoreline. In 1983, two colleagues, P. Thompson and D. Preston, surveyed parts of the island over two days and nights. In 1982, Teal were located along every stream surveyed and on all of the lakes. No more than two pairs of Teal were found on any stream and the lake at North-east Bay was divided between three pairs. In all, 32 adult birds were sighted, dispersed as illustrated in Figure 3. No birds were found on the beaches except at Sandy Bay. The less extensive survey in 1983 recorded 31 birds including 13 along the shoreline beyond Sandy Bay.

The data from neither year can be considered to be a complete survey. If an interpretive approach is adopted by allocating two pairs to each of the 12 main streams on the island and adding birds seen at lakes (three pairs, two singles) and along shorelines (20), a total of 76 is obtained.

Discussion

Port Ross Islands

These surveys suggest that approximately 50 birds reside on Rose Island, 8–20 on Ocean Island, a minimum of 81–109 and a maximum of 131–184 on Ewing Island, and 76 on Enderby Island; perhaps 215–330 over the four islands.

The results of surveys of Ewing Island in 1982 and 1983 are sufficiently similar (Table 2) to suggest that, within the constraints of the methodology and the confidence intervals, a reliable estimate of that island's population has been obtained. This island is the only one of the four surveyed to have extensive wave platforms about much of its coastline which are readily accessible to Teal, the only one on which extensive areas of washed-up seaweed remain and decompose (the invertebrates amongst which provide a rich source of food for Teal), and the only one that provides extensive overhead escape cover for Teal right to the water's edge. The island is also 'dry', with only two small trickles of running water, forming streams. This, and my only occasional sighting of Teal in the island's interior, suggest that almost all Teal are concentrated around the coastline.

In contrast, the 1982 and 1983 surveys of Rose Island (Table 1) gave dissimilar results. Estimates obtained in 1982 were much lower; there were at least 25 birds in 1983 in the area in which the weighted mean estimate in 1982 was 13.5 ± 13.2 . This disparity need not reflect an outstanding breeding season in 1983. More likely the low numbers seen or caught in 1982 were related to weather. The surveys on 27 February and 12 March 1982 were conducted in wet and squally conditions and it was my subsequent experience that Teal were considerably less active or conspicuous when the weather was both wet and windy. The 1983 survey was conducted in fine calm weather. Perhaps too, the 1982 survey coincided more closely with the main period of moult, at which time

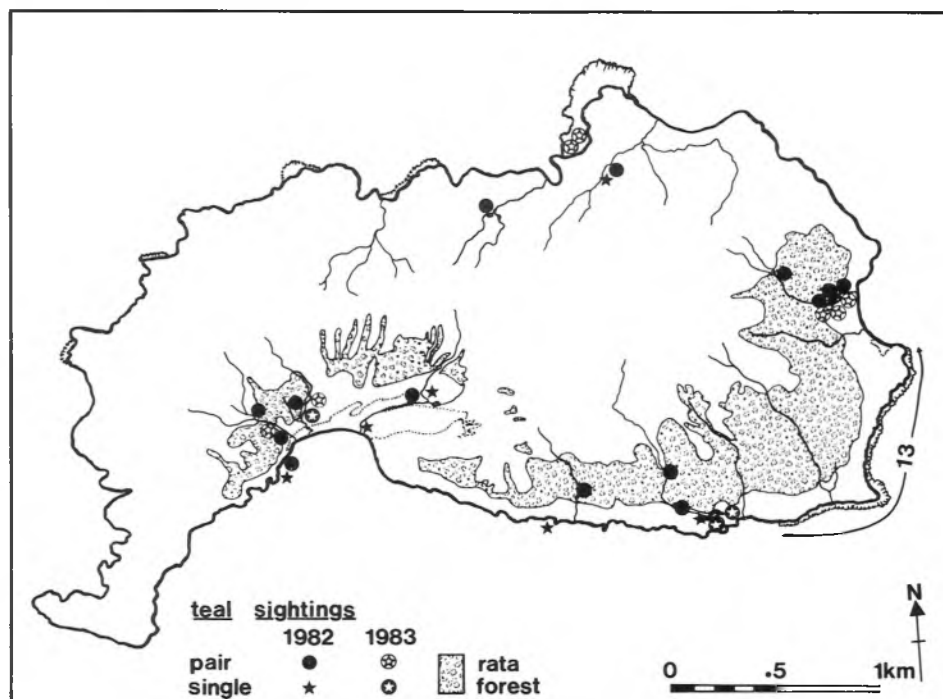


Figure 3. Enderby Island showing the locations at which Auckland Island Teal were seen during surveys in 1982 and 1983.

Teal may be less conspicuous.

All Teal observed on Rose Island were along the coastal margins in the water, on wave platforms, on beaches, or amongst *Poa* tussocks at the beach edge. Like Ewing Island, Rose Island is 'dry' having only the one stream of consequence and a smaller trickle course. No Teal were seen or flushed from these watercourses during daytime; they were not surveyed at night. It is possible, based on experience on Enderby Island, that up to two pairs may live permanently on the stream.

Only on Enderby Island did it appear that some Teal were resident away from the coast. On two lakes, more than one pair were resident, and on the larger lake at North-east Bay, three pairs exhibited very strong territoriality. It seems likely that any pair resident as the 'up-stream' pair on a stream would not pass through the neighbour's territory to exploit the coastline's resources but would, instead, remain in a stream's upper catchment. This was so with two pairs on a stream entering the sea at the western end of Sandy Bay; they were banded and the 'upstream' male was also

fitted with a radio-transmitter. The 'upstream' pair was followed over two days and remained on the edge of the forest and scrub in the island's hinterland and extended their activity only to some pools within the rata forest 300+ m from the coast. If Teal are able to extract all their requirements from the island's hinterland, this suggests that they could also occur elsewhere in wet boggy areas away from streams, areas not covered in this survey. It also suggests that the very extensive modification of the island by feral cattle *Bos taurus* and rabbits *Oryctolagus cuniculus* could have greatly reduced the habitat available to Teal by the removal of cover and the reduction of wetland vegetation.

While the results of this survey do no more than establish an 'order-of-magnitude' estimate of Teal on the islands of the Port Ross region, they do highlight the relative importance of Ewing Island. Although this island is much modified by *Olearia lyalli*, it is fortunate that it lacks the introduced mammals now on Enderby, Rose and Auckland Islands. This island, therefore, is of particular importance in the future

management of the sub-species and may well have a role in providing birds for trial release of Teal back onto Auckland Island.

Other islands

Teal also occur on Adams Island, where Falla (1975) suggested that "50+ pairs" were dispersed along the island's northern shoreline and lower level stream beds, and on Disappointment Island, where, because of the island's steep cliffs and only one watercourse, their number is unlikely to exceed 30 (personal observation). Falla (1975) also estimated that three pairs were resident on French's Island and reported Teal having been seen on the tiny Shoe and Passage (=Friday) Islands. Falla *et al.* (1979) encountered three birds and a family group of five on Dundas Island (vegetated area approx. 2 ha) and R. H. Taylor (pers. comm.) found seven pairs there, two with young, in 1985. R. H. Taylor found no Teal on Green Island or Figure-of-Eight Island but encountered one on the shore of Monumental Island in 1985.

Status

Falla (1975), commenting on the Teal population of the Port Ross area, stated "At a conservative estimate the number of breeding pairs is something of the order of: Ewing I., 40 pairs; Enderby I., 30-40 pairs; Rose I., 30 pairs; Ocean I., 10 pairs . . ." There is very close agreement between his estimates and those recorded during this study. On the basis of this field assessment his estimates for other islands can be accepted, and also his suggestion that "there is a total population of at least 500 birds . . ." Kear & Williams' (1978) estimate of 1200-1500, which they erroneously

credited to Weller (1975), seems much too high.

Auckland Island Teal are secure, provided that Adams Island and the four main islands of the Port Ross area remain free from cats now on Auckland Island, and rats. Their security would clearly be enhanced if Teal could be re-established on Auckland Island.

Acknowledgements

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Summary

The numbers of flightless Auckland Island Teal *Anas aucklandica aucklandica* on Rose, Ocean, Ewing and Enderby Islands of the Auckland Islands were determined by capture-recapture survey and direct counting in late summer of 1982 and 1983. These surveys suggested that approximately 50 Teal reside on Rose Island, 8-20 on Ocean Island, a minimum of 81-109 and a maximum of 131-184 on Ewing Island, and approximately 76 on Enderby Island; perhaps 215-330 over the four islands.

This survey, plus published estimates and sightings made on other islands of the Auckland group, suggested the numbers of Auckland Island Teal lies close to Falla's estimate of "at least 500".

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Murray Williams, Wildlife Service, Department of Internal Affairs, Wellington, New Zealand.

Auckland Island Flightless Teal, Rose Island, Dec. 1972 (B. D. Bell)

