The status, aviculture and re-establishment of Brown Teal in New Zealand

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Introduction

The Brown Teal *Anas aucklandica chlorotis*, the most threatened of New Zealand's endemic waterfowl, has a long history of having been kept in captivity in New Zealand, Britain and Europe. The possibility that captive-reared birds could be liberated to supplement wild populations or to establish new ones was tried, with success, on Kapiti Island in 1968 (Williams 1969, 1974). In 1973, Brown Teal, bred at the Wildlife Service's Mount Bruce Native Bird Reserve, were liberated in the Manawatu district of the North Island. In 1976, Ducks Unlimited (New Zealand), a newly-established organization to which most waterfowl aviculturalists now belong, became involved in the scheme. They established 'Operation Pateke' (Pateke is the Maori name for Brown Teal), the aims of which were to establish 50 pairs of Brown Teal in captivity; and to rear 1,000 Teal for release into the wild.

In 1980 a seminar was convened to discuss the avicultural and re-establishment programmes for Brown Teal. It was attended by most waterfowl aviculturalists, staff of the Wildlife Service and representatives of Zoological Societies.

This paper is a summary of the seminar's proceedings (Hayes 1981) and gives the details of a unique conservation project for which private aviculturalists are almost entirely responsible.

Past and present status of Brown Teal

Distribution at time of European settlement

In compiling details about the distribution and abundance of Teal in the 19th Century, one is very dependent on the writings of a small number of observers, and the information they have provided, however contradictory, has to be taken at face value. Many stated locations appear to be the ports at which agents obtained birds rather than the localities at which hunters collected the specimens.

At the time of European settlement (1840–1850), Teal were more common and widespread in the North Island than in the South Island and were recorded in all major swamplands (Figure 1).

The most frequently reported areas of abundance were in the swamps of Manawatu and throughout the Wairarapa valley, from Lake Wairarapa to at least Eketahuna (Buller 1882). Teal were also reported to be common in the great swamps and associated forests of Waikato, Hauraki and Bay of Plenty and were recorded throughout Northland (Pycroft 1898).

The full extent of their distribution in Hawkes Bay was not recorded but they occurred in the Petane district at Napier (Hamilton 1886) and at Tutira (Guthrie-Smith 1895). There are no records from Taranaki or King Country and although McKenzie (1971) referred to 'the great teal flocks of Gisborne', no early references to substantiate their presence there can be found. Buller (1882) referred to the presence of Brown Teal in the Urewera Ranges, but without specifying the locality.

In the South Island, the early distribution of Brown Teal is scantily recorded. They were reported from coastal Canterbury (Potts 1882), throughout Fiordland, lower Southland and on Stewart Island. Specimens, labelled as having been collected from West Coast and north-west Nelson, are in collections. But if Brown Teal were present elsewhere in the South Island, this has gone unrecorded.

Brown Teal also occurred on Chatham Island (Travers 1872) but were not recorded on other islands of the Chatham group.

The decline (Figure 1)

The vigorous draining of swamps and clearing of forests which characterized 19th Century New Zealand, together with the introduction of predatory mammals, precipitated a very rapid decline in Brown Teal numbers.

By 1882, they were reported as rare in Canterbury (Potts 1882) and there is no reference to their presence there subsequent to 1889, nor in Wairarapa after 1900. In all other districts, however, teal lingered

Wildfowl 33 (1982):73–80

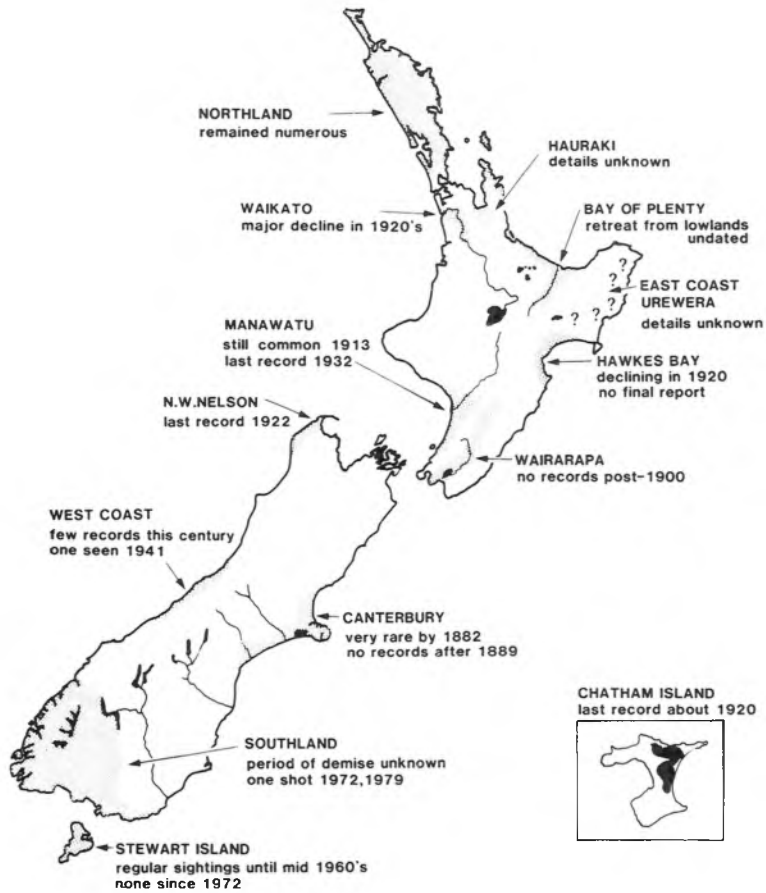

Figure 1. The recorded distribution of Brown Teal in New Zealand at the time of European settlement, 1840–1860, (stippled) and the timing of their disappearance or decline.

on into the 1900's but in greatly reduced numbers.

There followed, during the 1920's and 1930's, a period of major decline, and in many districts Brown Teal disappeared completely. The timing of this decline was co-incidental with the widespread disappearance of an indigenous rail, the Weka *Gallirallus australis*, and McKenzie (1971) has suggested that both animals were affected by an unknown disease. The disappearance or decline was most notable in the Waikato, Manawatu and Hawkes Bay districts of North Island and in Nelson and West Coast in South Island, the animals almost disappearing overnight. Unfortunately, this decline coincided with a period during which there was little writing on New Zealand ornithology and recorded details are few.

It seems unlikely that any single cause was responsible for the decline. If McKenzie's 'disease' was a factor, then its influence applied only to some parts of North Island (principally Waikato and Hawkes Bay), which leaves unexplained the disappearances in Manawatu and over much of South Island. Furthermore, Brown Teal disappeared from Gisborne-East Coast and sharply declined in Northland, areas in which Wekas remain common.

Land development and hunting must also have been major contributing factors. Up until 1921, Brown Teal were gamebirds in many districts and their final demise in Manawatu, and perhaps elsewhere, resulted from their continued hunting after having been declared protected. Land clearance and swamp drainage occurred with particular vigour in Southland and Hawkes Bay in the years following World War I and for the already depleted Teal populations there this may have been the *coup de grâce.*

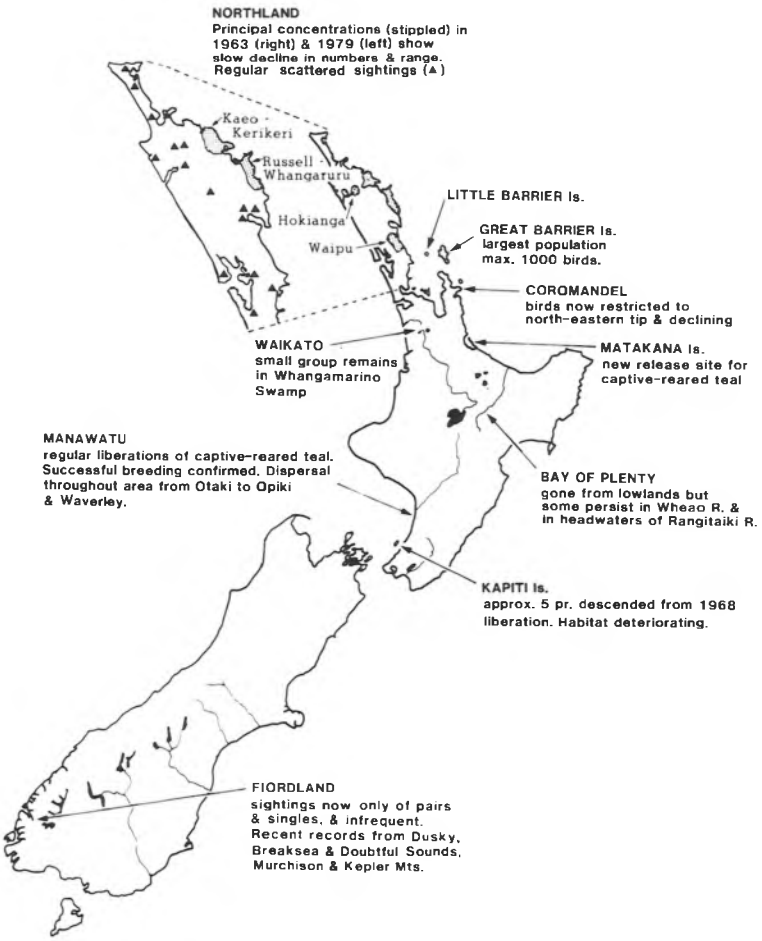

Figure 2. The present distribution and status of Brown Teal in New Zealand.

The role of mammalian predators in the decline of Teal can never be properly assessed. The only indirect evidence of their role comes from Stewart Island. Prior to the 1950's, Brown Teal were a common member of the island's avifauna. Thereafter, cats *Felis catus* became prominent and, coincidental with their increase, the Teal declined, finally disappearing from the island in 1972.

Present status (Figure 2)

In the South Island, Brown Teal are nearing extinction. They are now restricted to a small part of Fiordland National Park—near the coast at the heads of Dusky, Breaksea and Doubtful Sounds, and further inland on the mountain tarns in the Kepler and Murchison Mountains. Within this area, sightings are becoming increasingly infrequent and are usually of single birds, pairs or family groups. No communal flock sites are known. Occasionally, as in 1972 and 1979, single birds are shot during the hunting season in northern Southland. Presumably, these are stragglers from the Fiordland population, for no other nucleus of Teal is known.

In the North Island, birds remain at several localities. A small population, probably not exceeding five pairs, is present on Kapiti Island. These originate from a release of 10 captive-reared birds onto the island in 1968 (Williams 1969). This liberation proved extremely successful, for 70 young were raised in the three years after release, some of them eventually dispersing to, but not permanently coloniz-

ing, wetlands on the mainland nearby (Reid & Roderick 1972). Unfortunately, the limited habitat on the island has deteriorated and unless there is some wetland redevelopment in the near future this small Teal population will disappear from New Zealand's best known bird sanctuary.

Teal occur on several lakes in the Himitangi area of Manawatu. This population comprises the survivors and progeny of 320 captive-reared birds liberated there during 1973–1982. Breeding by these birds has been confirmed and the released birds and their young have dispersed widely over adjacent wetlands. Despite the numbers of birds released, a self-sustaining population has not yet been established and the future of Brown Teal in Manawatu remains dependent on further releases of captive-reared birds and translocated wild stock.

A small relict population remains in Bay of Plenty in the headwaters of the Rangitaiki River and on one of its tributary streams, the Wheao River. This population is unlikely to exceed 50 birds. Unfortunately, the Wheao River will be modified as a result of hydro-electric development and it is doubtful if the birds, displaced from the river during powerhouse construction work, will find conditions suitable for recolonization.

Another small relict population of unknown size remains in the last vestige of the Waikato swamplands, the Whangamarino Swamp. Individuals, presumably derived from this population, are occasionally seen elsewhere on the wetlands of Waikato and South Auckland. Provided the Whangamarino Swamp remains undeveloped. Brown Teal should persist there—a nucleus for possible colonization of and adaptation to the agricultural landscape.

The islands of the outer Hauraki Gulf, principally Little Barrier, Great Barrier and Great Mercury, and the tip of the Coromandel Peninsula contain the largest population of Brown Teal now remaining. The Great Barrier Island population was surveyed in 1957, 1976 and 1979, and was estimated to contain 640–700, 700 ± 300 and 658 birds, respectively (Wildlife Service files). This implies that the Great Barrier population is a stable one and, since these counts must be regarded as minimum counts, the numbers on the island probably lie between 800 and 1,000 birds. Several pairs of Teal occur on Little Barrier and Great Mercury Island and occasionally a pair is found on other Hauraki Gulf islands. On the Coromandel Peninsula, there is evidence of a declining range. Whereas in the 1940's Teal were recorded around both the western and eastern coasts of the Peninsula, the most recent survey, in 1965, found them only at the north-eastern tip. Today, Teal are rarely reported from Coromandel.

The other remaining stronghold of the species is in Northland. A combined Wildlife Service/Ornithological Society of New Zealand survey in 1963 identified three major concentrations—at Waipu, Russell–Whangaruru, and Kaeo–Kerikeri, with two minor concentrations adjacent to Hokianga Harbour.

A more thorough survey in 1979 highlighted the Teal's continuing decline in Northland. Most sightings were restricted to the Kaeo–Kerikeri and Russell–Whangaruru areas; the Waipua and Hokianga concentrations had gone. Isolated sightings were made in other parts of Northland, as indeed they have been throughout the 1970's (Figure 2).

There is no satisfactory estimate of the Northland population. A capture–recapture study at Russell–Whangaruru in 1977 suggested that a maximum of 200 birds resided in that area. Overall, it is most unlikely that the Northland population exceeds 500 birds, but it is clear that numbers are slowly declining. This is despite the bird showing signs of adaptation to the agricultural landscape by using over-grown farm ponds as breeding territories.

Aviculture

In the wild, the Brown Teal is a confiding animal, tolerant of man's presence. This attribute predisposes it to captivity and the least troublesome part of its aviculture has been the acclimatization of wild-reared birds to a captive environment.

Indeed, some wild adults have nested and raised young within four months of having been placed in small aviaries.

At present, 19 members of Ducks Unlimited hold 41 pairs of Brown Teal in captivity for breeding purposes and a further eight pairs are held by the Wildlife Service at its Mount Bruce Native Bird Reserve. All of these are derived from birds removed from the Great Barrier Island population; 22 between 1960 and 1972, 16 in 1974, and 23 in 1976.

Incompatibility

A major problem experienced in the early

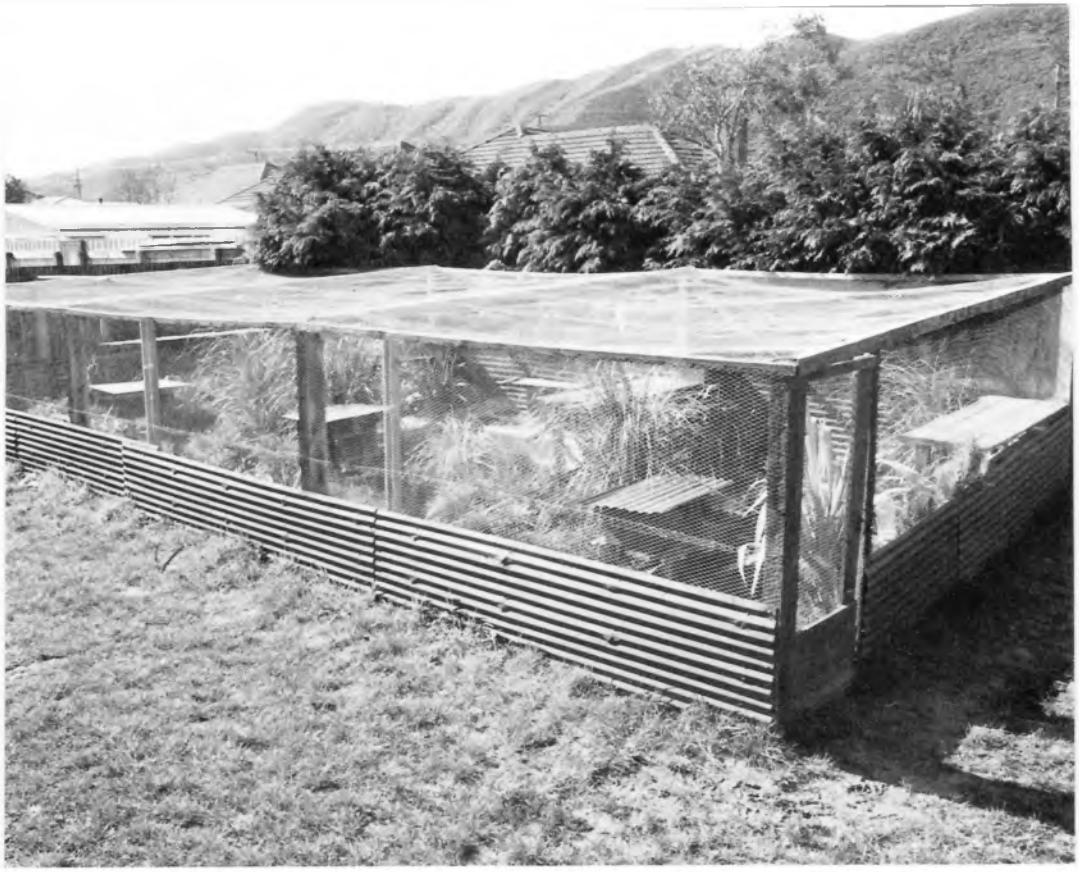

Figure 3. Three aviaries specifically designed to accommodate one pair of Brown Teal in each aviary.

years of Brown Teal aviculture was the bird's aggressiveness towards all other species of waterfowl, especially after pair-bonds had been established. Whenever a pair of Brown Teal shared a pond or aviary with other waterfowl, the teal's belligerency was such that the breeding success of other waterfowl was reduced and some birds hounded to death. Brown Teal dominate most species in any collection and have even driven off such large species as Paradise Shelduck *Tadorna variegata* and Black Swan *Cygnus atratus*. Only on very large areas of water will one, or at most two, pairs of Brown Teal exist without menace to other waterfowl, and even then their activities have to be constantly monitored.

Brown Teal are a strongly territorial species and in the wild pairs breed spaced well apart from others. This behavioural requirement is best provided in captivity by confining each pair to its own aviary. Indeed, the progress of the 'Pateke' project has been greatly enhanced by confining pairs in separate small aviaries, typical examples of which are shown in Figure 3.

Natural pairing

Natural pairings, where individuals choose their own mate, has proved the key to successful breeding. Most forced pairings have proved unsuccessful; seldom has breeding occurred in the first two seasons, and some pairs have failed to nest after three and four years. In contrast, natural pairings have all resulted in fertile eggs being laid in the first season.

The management procedure by which natural pairings are obtained mimics the Teal's behaviour in the wild. Outside the breeding season, Brown Teal form large flocks at traditional localities and it is within these flocks that pair-bonds are formed and existing bonds tested. To form pairs for breeding, Ducks Unlimited members collectively confine young birds to a single aviary until the Teal have sorted themselves out into pairs. The young birds selected for flock mating are usually the progeny of the most successful pairs. As strong pair-bonds are developed, as indicated by constant associations between birds, female inciting behaviour, male

fighting, and copulations, the pairs are removed and placed in their own aviaries.

An alternative technique is used at the Mount Bruce Native Bird Reserve. All males are placed in one half of a large pen, separated from all the females in the other half by a wire-netting barrier. Bonds appear to form across the barrier and when, about one month prior to the breeding season (late July), the barrier is removed, pairs are immediately recognizable.

Both flock mating procedures work extremely well, but in practice the maximum number of pairs that can be flock mated in any one aviary is 10. The bulk of Ducks Unlimited's flock mating is carried out in the aviary illustrated in Figure 4.

Once established, the pair-bond between Teal appears particularly strong and seldom do birds, retained together over several seasons, show any decline in egg fertility or clutch size. However, if any birds do fail to breed in any season, they are re-introduced to the flock mating procedure or they are released.

Avicultural techniques

Brown Teal are adapted to the advanced stages of the ecological transition of a wetland into solid ground. They are particularly at home amongst dense vegetation and an abundance of ground cover appears to be an important requirement in their aviculture. Otherwise their requirements are modest and they have bred best in aviaries of not less than 15 m^2 area and containing a small pond, perching platforms, at least two nest boxes and a permanently wet and muddy area in which they can dabble. The aviaries are best if totally enclosed so that the birds may be left full-winged.

Female Brown Teal can be induced to lay several clutches in a season. Reid & Roderick (1972) reported one female laying six clutches, totalling 40 eggs, in 131 days and another laying five clutches, totalling 22 eggs, in the one season. To exploit this productivity, Ducks Unlimited aviculturalists are encouraged to remove at least one clutch per season and incubate

Figure 4. The aviary used by Ducks Unlimited for flock mating up to 10 pairs of Brown Teal.

these artificially or under other waterfowl (Grey Duck *A.s. superciliosa* and Mallard *A. platyrhynchos* have proved successful foster parents). Where aviculturalists lack alternative incubation facilities, the Brown Teal are allowed to incubate and rear their young until about two-thirds grown. The ducklings are then removed and the females will sometimes re-nest. One female surprised us by laying 11 fertile eggs while in the process of rearing six ducklings. During 1980/81 season, the maximum number of eggs derived from a single female was 38 and, on average, all Ducks Unlimited breeders obtained eight eggs from each of their females.

An attempt is being made to induce Brown Teal to lay in elevated nest boxes. Those that do so are allowed to incubate their eggs in the hope that the ducklings may become imprinted on this type of nesting structure. The provision of predator-proof nest boxes in the wild is seen as an important management tool to aid the establishment of captive-reared Brown Teal after liberation.

Re-establishment

Although the first release of captive-reared Teal into the Manawatu district took place in 1973, it was not until 1977 that the supply of birds for release became sufficient to allow annual liberations. Since 1977, 510 Teal have been reared, 130 of them during the 1980/81 breeding season and a further 130 in 1981/82 and to date, 320 Brown Teal have been released onto the adjacent wetlands of Pukepuke Lagoon and Lake Koputara. From these, Teal have dispersed to a number of other wetlands in the Manawatu district, from Otaki to the south, north to Waverley and inland to Opiki. Observations of these birds in the months after their release show that they survive well, but the disturbance engendered by the annual waterfowl hunting season causes them to disperse and, sadly, at least six birds are known to have been shot by hunters.

Breeding by the released birds at Pukepuke Lagoon was suspected in 1978 and confirmed in 1980 when two broods, of five and six ducklings, were reared. It would be surprising if the released birds had not bred in other years, but observations are hindered by the bird's secretive nature.

Further releases of Teal onto other lakes of the Manawatu district are planned over the next three years. After that, the success of 10 years of liberations will be assessed to determine whether efforts there should be continued. In the meantime another major liberation site, on Matakana Island near Tauranga (Figure 2), has been established. Sixty-four birds were released on to one of three wetlands on the island in early 1981 and, with the help of further liberations, it is hoped that the birds will establish there and on nearby mainland wetlands.

The policy adopted by Ducks Unlimited and Wildlife Service with respect to release sites is that they should be few in number, be in areas where Brown Teal formerly existed and remote from disturbance and preferably not hunted over. They should have numerous freshwater and estuarine wetlands nearby which the birds can colonize. In future, no release will be of fewer than 20 birds and releases at each site will continue annually over several years.

The possibility that wild birds may be 'creamed' from the Great Barrier population and used to supplement the liberations of captive-reared Teal is now being considered. However, no birds will be removed until the productivity of the Great Barrier population has been properly assessed. To this end, Ducks Unlimited is attempting to raise finance to support a three-year research project to be conducted under the auspices of the Wildlife Service. This approach demonstrates the important and leading role that even small organizations can play in the conservation of rare and threatened species.

Acknowledgements

The success of the Brown Teal conservation project—Operation Pateke—remains dependent on the enthusiasm of the many private aviculturalists who have contributed so much of their time and resources in seeing the project to its present stage. It is a pleasure to acknowledge their dedication and the support given to them by the membership of Ducks Unlimited (New Zealand). The project derives much of its impetus from the cordial relationship maintained between the Wildlife Service and Ducks Unlimited and it is a pleasure to acknowledge the encouragement extended to Ducks Unlimited by the Director of the Wildlife Service, R. T. Adams, and his staff at the Mount Bruce Native Bird Reserve.

Ducks Unlimited gratefully acknowledges the financial support of Mobil Oil (NZ) Ltd, whose Mobil Environmental Grant funded a highly successful management seminar in 1980.

Summary

Brown Teal *Anas aucklandica chlorotis*, New Zealand's most threatened waterfowl, is restricted to a few relict populations, numbers no more than 1,500 and continues to decline slowly in both numbers and range. The species adapts readily to captivity and, in a co-operative programme involving Ducks Unlimited (NZ) and the New Zealand Wildlife Service, is being bred for release to establish new populations. Since 1977, 510 Teal have been reared in captivity and to date 390 have been released into the Manawatu district of North Island and on Matakana Island. Captive-reared birds have bred successfully in the wild.

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The New Zealand Brown Teal at the Wildfowl Trust

Two pairs of Brown Teal were received at Slimbridge in 1957. One of these pairs bred in 1960, the first breeding record in captivity. Breeding continued for the next nine years but with decreasing success. Infertility, probably arising through inbreeding, seemed to be the main problem. The stock dwindled through the 1970s until only 3 males survived. In 1979, Ducks Unlimited (New Zealand) sent two females to Slimbridge, which immediately had the desired effect. Fourteen young were reared in 1980, and 16 more in 1981.