

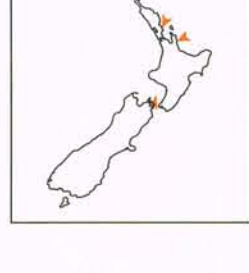
Small group of distinctive flightless and generally nocturnal birds. More often heard than seen; most vocal in the first two hours of darkness. Males smaller and have loud shrill clear ascending whistle; females deeper hoarse whistle, often given in response to male call; calls repeated 10–25 times. Large cone-shaped birds with small head and long bill with nostrils near tip; minute remnant wings and no tail; coarse loose feathers; strong legs and toes with long claws. Slow lumbering gait, but can run fast. In native forests, scrub, rough tussock grassland and in some exotic forests; from sea level to subalpine. Kiwi snuffle as they explore for food on ground. Feed on invertebrates (especially worms, bugs, beetles and spiders) and fallen fruits, from surface and by probing up to 10 cm into soil. Lay 1–2 huge white eggs in a burrow, hollow log or under dense vegetation. Very long incubation – by the male only in Little Spotted Kiwi and Brown Kiwi in the North Island, but by male and female in Great Spotted Kiwi and Brown Kiwi in the South Island, and by the pair plus helpers in Brown Kiwi on Stewart Island. Chicks hatch fully feathered, like miniature adults, and are mobile within a week but return to the nest each day for several weeks or even years.

LITTLE SPOTTED KIWI (Kiwi-pukupuku) *Apteryx owenii* Rare endemic

30 cm; ♂ 1150 g, ♀ 1325 g. Smallest kiwi. Brownish grey finely mottled or banded horizontally with white; long ivory bill; pale legs and claws. Male high-pitched ascending whistle; female lower and more tremulous; call rate faster and higher pitched than other kiwi, especially the female. **Habitat:** Native forest, scrub and grassland on a few offshore islands: c. 1,000 on Kapiti I, small populations have been established on Hen, Tiritiri Matangi, Red Mercury and Long (Marlborough) Is, and at Karori Sanctuary, Wellington. Some may persist in Westland or Fiordland.

Breeding: Sep–Feb.

[Sp 2]



KIWI

3 species: family endemic to New Zealand.

Kiwi are flightless birds standing up to 45 cm high. They are evidently an early offshoot from the evolutionary line of the primitive flightless ratites (moa, emu, cassowary, ostrich and rhea). Kiwi are more closely related to emus than moa. They are one of the oldest members of the New Zealand avifauna as their ancestors are believed to have been in New Zealand when it broke away from Gondwanaland about 65 million years ago. Kiwi are usually nocturnal, but on Stewart Island some forage by day. They have small eyes but apparently good night vision. Large ears enable good hearing. Kiwi have a very well-developed sense of smell; the nostrils are uniquely placed near the tip of the long, sensitive bill. They can be heard breathing through the nostrils as they explore the ground for food, producing a snuffling sound like that of a hedgehog.

Long, tactile facial bristles surround the base of the bill. The feathers have a simple structure with a single rachis and unlinked barbs, and they hang loose like hair. The wings are minute and largely unfeathered, but they have a soft claw at the tip. They have no tail, and thus look distinctively rounded or pear-shaped. The legs are short and powerful; the three forward-pointing toes and small hind toe have long sharp claws, used for fighting and digging. Other unusual physical features of kiwi are that females have a pair of functional ovaries rather than just one, and that the body temperature and metabolic rate are lower than in most other birds.

Kiwi live from sea level to alpine tussockland and herbfields at about 1500 m asl. They are mostly in native forest but are also found in scrubland, rough farmland, swamps and pine forests, especially where native vegetation remains in the gullies. Diet is mainly invertebrates, particularly insect larvae, worms and spiders, taken from the soil by plunging their bill deep into the earth, often right up to the 'hilt'. Kiwi also eat fallen fruits.

Females are larger and heavier than males. In proportion to the size of the female, the egg

Apterygidae

is very large at about 15–20% of body weight. It is also very rich in nutrients and energy. She lays 1–2 white or greenish eggs in a burrow, in a hollow log or under dense vegetation, the eggs laid 2–4 weeks apart. The very long incubation of 65–85 days is by the male only in the Little Spotted Kiwi and the Brown Kiwi in the North Island, by the male and female in the Great Spotted Kiwi and the Brown Kiwi in the South Island, and by the pair and helpers in the Brown Kiwi on Stewart Island. Brood patches develop on incubating birds. Each chick hatches fully feathered and first leaves the nest about a week later. It feeds unaccompanied, and returns less and less often to the nest. The young usually stay in the territory for several months, but they disperse as the next breeding season approaches, except on Stewart Island, where family groups remain together.

Although seldom seen, kiwi indicate their presence by their penetrating calls. Call rates are highest in the two hours after dusk and before dawn. Males and females often duet, with the male call being a drawn-out, ascending, shrill whistle note, repeated 15–25 times, whereas the female call is a hoarse, guttural note, repeated 10–20 times.

The range and number of all kiwi species has been reduced since humans arrived in New Zealand, but especially over the last hundred years. Forest clearance has reduced available habitat, and populations have become fragmented and isolated, but the main impact now is from introduced predators: possums damage eggs, and mustelids and feral cats kill young chicks, and adults are especially at risk from dogs, ferrets and poorly set possum traps. Kiwi are sometimes killed on roads at night. Injured kiwi have been kept in captivity, and much has been learned of their habits. Brown Kiwi and, recently, Little Spotted Kiwi have been bred in captivity, and Brown Kiwi are on display at captive breeding facilities in New Zealand and overseas.

Reading: www.kiwirecovery.org.nz. DoC *Threatened Species Rec Plan Ser No. 2*. Fuller, E. (ed) 1990. *Kiwis*. Auckland: SeTo Publishing. Peat, N. 1999. *Kiwi: NZ's Remarkable Bird*. Auckland: Godwit. Reid, B. & Williams, G.R. 1975. In *Biogeography and Ecology in New Zealand*. The Hague: Junk.

2. LITTLE SPOTTED KIWI *Apteryx owenii* Plate 1

Other name: Kiwi-pukupuku

Size: 30 cm; male 1150 g, female 1325 g

Distribution: Subfossil and Maori records remain indicate that Little Spotted Kiwi were widespread throughout mainland New Zealand in pre-European times. A single specimen collected in the Tararua Ranges in 1875 is the only recent record in the North Island. Many specimens were collected in the South Island. They were still common in Westland at the start of the twentieth century, but they have declined dramatically and now only a few scattered birds may persist in forests between Fiordland and northwestern Nelson. A few survived on D'Urville Island, Marlborough Sounds, until the 1980s, when the final two were shifted to nearby predator-free Long Island, where they have bred with birds brought from Kapiti Island. The main population is on Kapiti Island; their origin is not clear, but they were probably introduced in the 1920s from the South Island. Small populations have been established recently on Hen Island, Tiritiri Matangi Island, Red Mercury Island, and Long Island (Marlborough Sounds).

Population: 1400 in 2005: Kapiti Island c. 1200, Hen Island 100, Tiritiri Matangi Island 60, Red Mercury Island 40, Long Island 30, captivity 3.

Conservation: Protected endangered endemic. The main population, on Kapiti Island, is apparently stable, has many juveniles and may have benefited from the eradication of possums in the 1980s. The population seems near carrying capacity, because gaps created by transfers to other islands are filled quickly. Fire or the introduction of predators is a risk for the species, and so a programme is under way to establish populations on other islands also free from mustelids and cats. In 1983, 12 birds were transferred to Red Mercury Island, and by 2001 there were at least 50 birds. In 1988–89, 38 birds were transferred to Hen Island, and by 1995 there were at least 50 birds. Two birds from D'Urville Island and three from Kapiti Island were introduced to Long Island between 1981 and 1987, and by 2003 there were at least 30 birds on the island. In 1993, five pairs were transferred from Kapiti to Tiritiri Matangi Island, and a further six birds were added in 1995; by 2002 the

population stood at 50 birds. In 2000–01, 40 Kapiti Island birds were transferred to Karori Sanctuary, Wellington, and they have bred well.

Breeding: Most eggs are laid in September–January. They lay 1–2 white eggs (110 x 70 mm; 300 g) in a burrow, in a hollow log or under dense vegetation. In two-egg clutches (rare), the eggs are laid 2–3 weeks apart. Incubation is by the male only and takes 65–75 days. The chick hatches fully feathered and remains in the nest 4–5 days before venturing out unaccompanied. It returns to the nest for several weeks but may stay away for the odd day. Chicks seem to stay close to their natal territory for at least 6–9 months before dispersing to find a vacant territory. Growth continues for at least 30 months, but sometimes they form pairs before fully grown. Pairs are monogamous and persist all year and between years. The oldest bird recorded in the wild was at least 22 years old in 2002, but life expectancy on Kapiti Island is c. 45 years.

Behaviour: Most vocal in spring and summer. The male call (higher pitched and clearer) is often answered immediately by its mate. The male and female of a pair usually feed separately at night but spend about 25% of days together. During courtship, pairs often remain together for hours and make loud grunts and snuffling sounds.

Feeding: Diet is mostly small invertebrates but includes some fallen fruits and occasional leaves. Main prey are earthworms, larvae of beetles, cicadas, flies and moths, spiders and adult beetles, with the proportions varying from place to place and with season. Most are taken from the upper layer of the soil, leaf litter or rotting logs. When feeding, the bird walks slowly along, tapping the ground and sniffing loudly; it sometimes plunges its bill into the earth, but rarely right up to the 'hilt'.

In the hand: The adult male develops a brood patch in summer. Sexes can be distinguished by size, with no overlap in adult bill measurements: males 62–68–73 mm, females 75–84–94 mm. Adult females are heavier (1010–1350–1920 g for non-gravid birds) than adult males (880–1125–1450 g). Birds in good condition under 1000 g are considered juveniles, but males in poor condition (e.g. after incubation) can be as light as 880 g. The bill of juveniles continues to grow for at least the first 30 months. Adult females have greyer backs and smaller, paler legs and toenails than the otherwise similar juvenile Great Spotted Kiwi.

Reading: Colbourne, R. *et al.* 1990. *NZ J Zool* 17: 533–542. Colbourne, R. 1992. *J Roy Soc NZ* 22: 321–328. Colbourne, R.M. & Robertson, H.A. 1997. *Notornis* 44: 253–258. Jolly, J.N. 1989. *J Roy Soc NZ* 19: 433–448. Jolly, J.N. 1990. In *Kiwis*. Auckland: SeTo Publishing. Robertson, H.A. *et al.* 1993. *Notornis* 40: 253–262.