

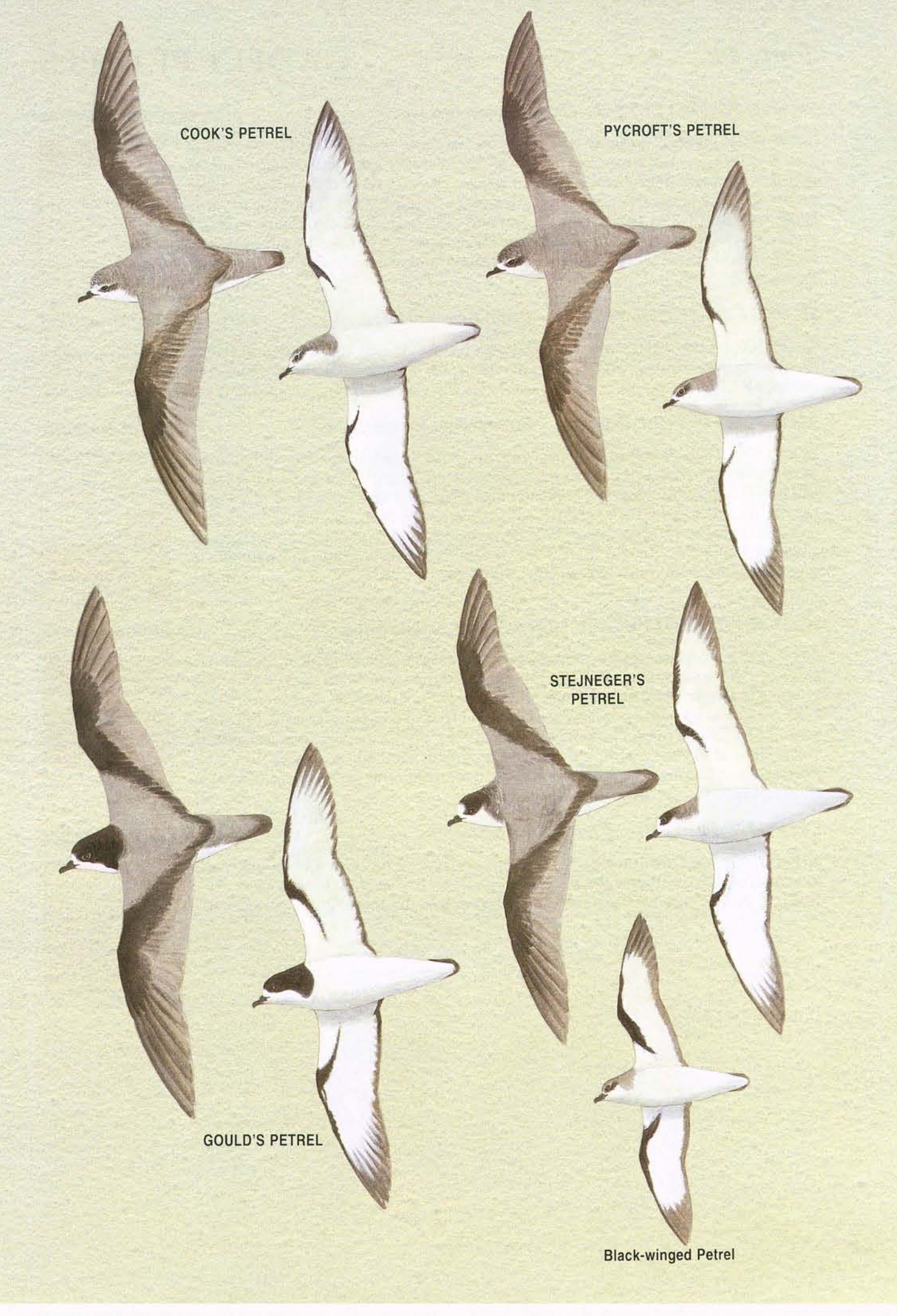
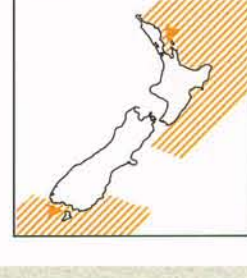
Medium to large seabirds with mostly short deep and heavily hooked bill, nostrils encased in a tube, joined at the base of the bill. Most are dark above and mainly white below. Sexes and ages alike; males slightly larger. Underwing patterns are often distinctive. In flight, long narrow wings held stiffly and appear graceful as they glide and wheel in huge arcs. Generally oceanic; rarely seen near land. Many species highly migratory. Many species give high-pitched repetitive calls over breeding grounds at night. Lay 1 large egg, usually deep in a burrow. Long incubation and fledging periods.

COOK'S PETREL (Titi) *Pterodroma cookii*

Uncommon endemic

29 cm, 200 g. Forehead white, scaled grey on forehead; dark eye patch; crown and upperparts pale grey with dark M across wings. Underparts and underwings white except mottled black patch at bend of wing extending towards tip and as short diagonal line a short way towards body. Bill long and fine (28 x 10 mm), black; legs and feet bluish with yellowish base of webs, dark toes and ends to webs. **Habitat:** Breeds Little Barrier, Great Barrier and Codfish Is. Migrates to eastern Pacific, from California to Chile. **Breeding:** Oct–May.

[Sp 53]



SHEARWATERS, FULMARS, PRIONS and PETRELS

Procellariidae

The Procellariidae is the largest and most diverse family of seabirds, with about 72 species. In the New Zealand region, 49 species have been recorded, including 11 endemic species and 23 other breeding species.

The Procellariidae includes a wide variety of seabirds from the giant petrels to the diving petrels. All have distinctive external nostrils encased in a tube on the top or sides of the bill. They have 11 primaries. The 11th (outermost) is minute, but the 10th is at least as long as the 9th, giving the wing a pointed tip. All seabirds have webbed feet with three forward-pointing toes of about the same length.

Most species nest in burrows or crevices, normally clumped into colonies. Birds return

being chilled for six days. Incubation stints shorten as incubation proceeds, and when the egg hatches the downy chick is brooded and guarded for only a few days in hole-nesting species, but for several weeks in surface-nesting species, until it is able to maintain body temperature.

Throughout its development, the chick is fed large meals at irregular intervals. It gains weight rapidly, becoming much heavier than its parents, but this declines towards adult weight before it fledges. Chicks normally spend some time on the surface exercising their wings before they eventually leave the colony. Once they have flown, they are completely independent of their parents. Young birds usually return to their home colony at 2–7 years old, and spend several years visiting the colony, especially when breeders are incubating or feeding chicks, before attempting to breed. The Procellariidae are typically long-lived, with several species known to live over 25 years.

Most species now breed only on offshore and outlying islands because mainland colonies have been ravaged by introduced mammalian predators. They generally return to their colonies at night, and once on land they are clumsy and unable to take flight rapidly; their only defence is by biting or by spitting stomach oil. The nestling is particularly vulnerable to predators because it is often left unattended for long periods while the parents feed at sea and it emerges from the nest at night to exercise its wings in the week or two before it can fly.

The Procellariidae feed on a wide variety of sea life, ranging from some of the prions, which sieve zooplankton on comb-like lamellae along the edge of their bills, to the giant petrels, which scavenge on dead marine mammals and occasionally kill small seabirds. Most species feed within a few metres of the sea surface, but some shearwaters dive to at least 20 m. These seabirds have well-developed nasal glands for extracting salt from their blood and exuding it out of the prominent nostrils.

The shearwaters (*Calonectris*, *Puffinus*) include about 15 medium to large species with long slender bills and flat nasal tubes. They

to their colony months before egg-laying to claim their nest sites (usually the same site is used year after year) and to court. After copulation, females leave the colony for one to six weeks on a 'pre-laying exodus' to form the egg. Males also leave but often make occasional visits to the nest site.

All species lay one white egg, which is very large relative to the female's size. The few instances of two eggs in a nest are from two females using the same site. A long incubation period is typically split up into several incubation stints lasting from several days to several weeks between changeovers. Occasionally the changeovers do not coincide and the egg is left unattended for several days; however, eggs have hatched successfully after

are usually brown to black above and white or brown below. Some have large sternums and dive well for fish and squid, using their wings for propulsion, while others have small sternums and feed on, or close to, the surface.

The four species of diving petrel (*Pelecanoides*) are small, stocky black and white seabirds with short wings adapted for propulsion under water. They have a fast, direct, whirring flight and readily dive for small krill and copepods.

The four species of *Procellaria* are large stocky seabirds with large, heavily hooked pale bills with dark markings and prominent nostrils. They feed mainly at night on bioluminescent squid but also now take offal discarded from fishing boats.

The three species of *Pseudobulweria* are medium-sized seabirds with exceptionally large feet and a notch on the cutting edge of the upper bill caused by the latericorns having blunt ends.

The fulmarine petrels (*Lugensa*, *Pagodroma*, *Daption*, *Thalassoica*, *Fulmarus* and *Macronectes*) are a diverse group of 8 species, all of which have robust bills with prominent joined nasal tubes, rising from the base.

The six species of prion (*Pachyptila*) are small seabirds pale blue above and white below with a prominent M-shaped mark across the upperwings and a dark-tipped tail. Comb-like lamellae on the inside of the bill are used to filter zooplankton.

The single *Halobaena* species looks like the prions but has a white-tipped tail and the upper bill has small tooth-like serrations at the base.

The gadfly petrels (*Pterodroma*) consist of 29 species of highly agile seabirds with long wings and short, laterally compressed black bills with a strongly hooked nail. They feed mainly on squid and small fish.

**Reading:** Harrison, P. 1987. *Seabirds of the World: a photographic guide*. London: Christopher Helm. Harrison, P. 1988. *Seabirds: an identification guide*. London: Christopher Helm. Imber, M.J. 1985. *Ibis* 127: 197–229. Murphy, R.C. 1936. *Oceanic Birds of South America*. New York: MacMillan. Serventy, D.L. et al. 1971. *The Handbook of Australian Seabirds*. Sydney: Reed. Warham, J. 1990. *The Petrels: their ecology and breeding systems*. London: Academic Press.

53. COOK'S PETREL *Pterodroma cookii*

Plate 13

**Other name:** Titi  
**Size:** 29 cm, 200 g  
**Distribution:** Breed only in New Zealand, on Little Barrier, Great Barrier and Codfish Islands. Subfossil and midden evidence suggests that they formerly bred on the mainland of both North and South Islands. During the summer breeding season, they range mainly east of New Zealand, especially off the North Island between East Cape and Cook Strait, and east of Foveaux Strait.

Cook's Petrels migrate to the eastern

Pacific Ocean, mainly between 34°S and 30°N and straggle further north into the Gulf of Alaska. They leave New Zealand waters in April and return about August, although a few remain through the winter. They are the commonest small gadfly petrel beachwrecked on the New Zealand coast. About 25 are found each year, mainly on Auckland and Bay of Plenty beaches with peaks in December and March–April, when chicks have just fledged.

**Population:** c. 50,000 pairs on Little Barrier

Island, <5 pairs on Great Barrier Island and 100 pairs on Codfish Island (Whenua Hou). **Conservation:** Protected endemic. Chicks used to be collected by Maori, and adults were killed when attracted to fires lit on flight paths to colonies, but they are now protected. About 20,000 pairs of Cook's Petrels bred on Codfish Island in the early 1900s, but predation by Weka reduced them to 100 pairs by 1980; however, they are showing signs of recovery since Weka were removed from the island in 1985. Likewise, the numbers on Little Barrier Island have increased after the eradication of cats there in 1980 and further gains are expected after the eradication of kiore in 2004. Pacific rats are at all breeding sites and still cause serious losses of eggs and chicks.

**Breeding:** Adults return to their colonies in August to prepare burrows and to court. Laying is from 23 October to 3 December on Little Barrier Island, but about a month later on Codfish Island. They lay 1 white egg (53 x 39 mm, 43 g) in a deep burrow 1–5 m long. Eggs hatch on Little Barrier from mid-December to mid-January after c. 47 days, and young fledge from mid-March to mid-April at c. 88 days old. Chicks fledge from Codfish Island from mid-April to early May.

**Behaviour:** Nest in large colonies, often interspersed with Black Petrels in the north. They are very vocal over their colonies, with a rapid three-note 'kek-kek-kek' and other aerial calls, and they make high-speed dives above the colony with vibrating feathers making a whistling sound. On the ground, they give a loud purring call. Cook's Petrels often call over land as they are heading for their breeding colonies, and are heard over Northland, Auckland and Stewart Island at night.

**Feeding:** Diet is mainly squid, crustaceans and small fish. Judging from the composition of the diet, most prey is probably taken at night.

**In the hand:** Cook's Petrels are similar to about 10 other small gadfly petrels, but they have a very pale underwing with only a small black line extending from the bend of the wing towards the body. Their wing (223–245 mm) and bill (24.5–30 mm) are longer than most similar species (Pycroft's, Stejneger's and Gould's Petrels), and they have a white wedge-shaped patch covering about 60% of the inner web of the primaries, which is not as large on other species, with the exception of some Pycroft's Petrels.

**Reading:** Powlesland, R.G. 1987. *Notornis* 34: 237–252. West, J.A. 1990. *DoC Sci & Res Int Rep* No. 85.