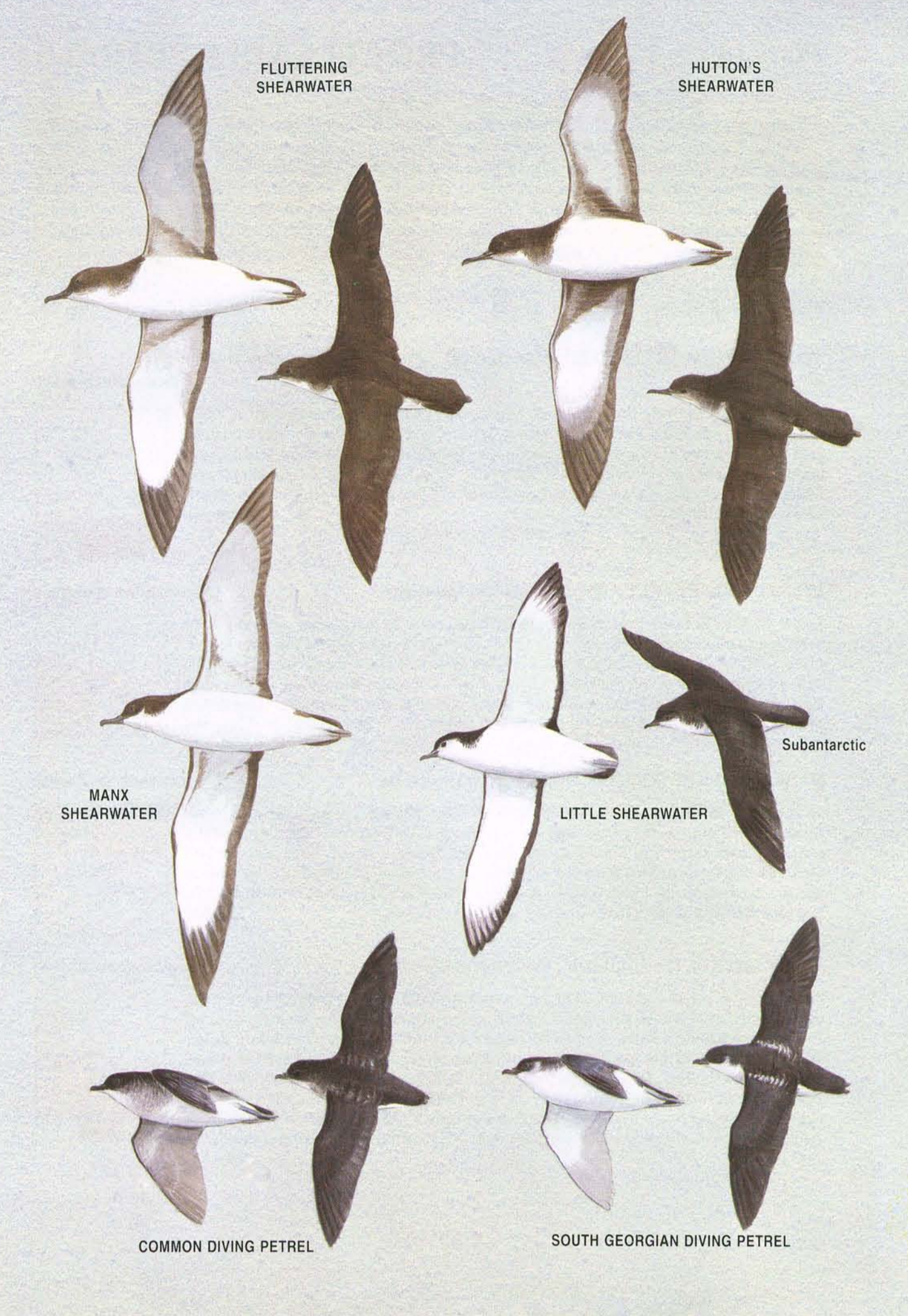


Diving petrels are small stocky seabirds with short broad wings, short wide bill and paired nostrils opening upwards; blue legs. Sexes alike. Fast whirring flight close to the surface. Generally coastal. Do not follow ships or trawlers. Noisy at night over and at breeding colonies.

SOUTH GEORGIAN DIVING PETREL *Pelecanoides georgicus* **Rare native**

18 cm, 120 g. Like Common Diving Petrel at sea, but underwing usually paler. In hand, underwing coverts white, inner webs of 3 outer primaries white or pale grey, septal process in bill near centre of nostril. **Habitat:** Breeds circumpolar subantarctic; in NZ region, only on Codfish I, off Stewart I. **Breeding:** Nov–Mar. [Sp 30]



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: their ecology and breeding systems*. London: Academic Press.

30. SOUTH GEORGIAN DIVING PETREL

Pelecanoides georgicus **Plate 9**

Size: 18 cm, 120 g

Distribution: Circumpolar, breeding in the subantarctic zone. The only colony in New Zealand is on Codfish Island (Whenua Hou), although as recently as 1943 they bred on Dundas and Enderby in the Auckland Islands, and subfossil remains indicate huge colonies were at Mason Bay, Stewart Island and probably on Chatham Island. They are thought to be sedentary, but judging by stomach contents of Codfish Island birds, they apparently feed well offshore near the edge of the continental shelf.

Population: A common species, with millions of pairs nesting on South Georgia, the Kerguelen, Prince Edward, Crozet and Heard Islands. Codfish Island has 60–70 pairs.

Conservation: Protected native. The colony

on Codfish Island, identified in 1978, was previously assumed to be of Common Diving Petrels. The former colonies in sand dunes on Dundas and Enderby Islands were probably destroyed by trampling of cattle and Hooker's sea lions, and by the interference of rabbits. Weka, a potential predator of fledglings on Codfish Island, were eradicated by 1986. The breeding habitat on Codfish Island is limited to a small area of sand dunes, and people are now prevented from walking over these dunes, and the population is increasing steadily.

Breeding: On Codfish Island, birds spend September–October cleaning out their deep burrows in unstable and sparsely vegetated sand dunes, 1–5 m above the high-tide line. Eggs are laid in early November, a month

earlier than at other, more southern breeding colonies. No other New Zealand information on breeding. Elsewhere, they lay 1 white egg (39 x 32 mm), incubation is for 44–47–52 days, and chicks fledge at 43–50–60 days old.

Behaviour: On Codfish Island, they breed in a loose colony scattered along about 1 km of sand dunes, separate from other seabirds. Adults call in the air over the colony but return directly to their burrows, spending little time on the surface.

Feeding: Diet of the Codfish Island birds is small krill, fish and squid, taken mainly by

diving into the sea from a metre or two above the surface, then swimming underwater using their wings for propulsion.

In the hand: The two species of diving petrel can be reliably separated only in the hand – see Common Diving Petrel.

Reading: Imber, M.J. & Nilsson, R.J. 1980. *Notornis* 27: 325–330. Jouventin, P. et al. 1985. *Notornis* 32: 157–220. Payne, M.R. & Prince, P.A. 1979. *NZ J Zool* 6: 299–318. Weimerskirch, H. et al. 1989. *Emu* 89: 15–29. West, J. & Imber, M.J. 1989. *Notornis* 36: 157–158. Worthy, T.H. 1998. *Notornis* 45: 229–246.