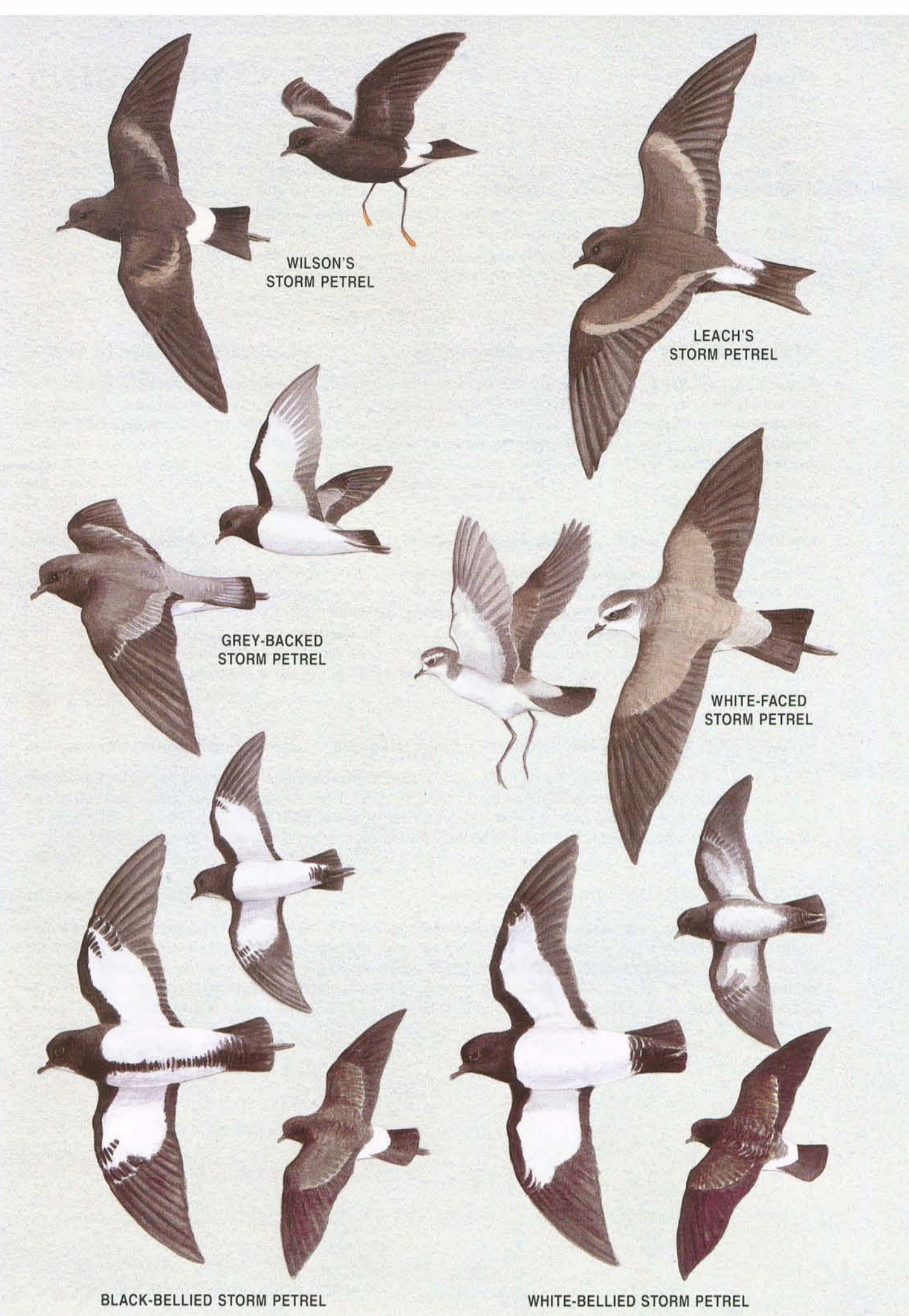
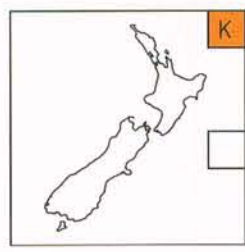


Very small dainty seabirds with broad rounded wings, short bill with a prominent nostril with a single opening, and very long legs. Mostly black or grey upperparts except for rump. Sexes and ages alike. Fly close to the surface, erratically with short glides or hops. Pick up food while hovering or pattering on the water. Oceanic; rarely follow boats. Most silent at night over colonies, but give coos, churrs or whistles from burrows or the ground.

WHITE-BELLIED STORM PETREL *Fregatta grallaria*

Rare native

20 cm, 50 g. Variable plumages; some like a few Black-bellied Storm Petrels, but feet level with tip of tail. Typically has black upperparts, mantle feathers often white-tipped; rump white; black chin, throat and breast contrasts with white belly; black undertail. Some have smudgy, not white, underwings. **Habitat:** Breeds subtropics, including Kermadecs. Ranges widely at sea but rarely seen off NZ coast. **Breeding:** Jan–Jun. [Sp 71]



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

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

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 nesting 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 gannet 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

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 tip. 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.

STORM PETRELS

The Oceanitidae are very small seabirds, ranging from Antarctic waters to the tropics. There are 21 species, of which 5 breed in the New Zealand region, and 1 is a vagrant.

The storm petrels are small, delicate birds with a weak black bill. They have prominent nostrils encased in a single, often prominent tube at the base of the bill. They have 11 primaries, but the 11th (outermost) is minute. The 10th primary is shorter than the 9th, giving the wing a rounded tip. The legs and

Oceanitidae

webbed toes are long and are used to skip or patter along the sea surface as the birds look for zooplankton.

The biology of storm petrels and the threats to them are like those of the Procellariidae (see page 184). The main differences are that females are larger than males, they lay the heaviest egg relative to female weight of any birds (typically in the range of 25–29% of female weight for the smaller species), and the egg is regularly unattended for one or more days at a time during incubation, which

makes the total incubation period highly variable.

Reading: Harrison, P. 1987. *Seabirds of the World: a photographic guide*. London: Christopher Helm. Harrison, P. 1988. *Seabirds: an identification guide*. London: Christopher Helm. Lockley, R.M. 1983.

Flight of the Storm Petrel. Newton Abbot: David & Charles. 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.

71. WHITE-BELLIED STORM PETREL *Fregatta grallaria* Plate 17

Size: 20 cm, 50 g

Geographical variation: Four subspecies: the nominate *grallaria*, which breeds in the Kermadecs and at Roach Island, Lord Howe Island, and the only form known from New Zealand.

Distribution: Breed widely on subtropical or temperate islands in the South Atlantic (Tristan da Cunha Group), South Indian (St Paul Island) and South Pacific Oceans (Lord Howe, Kermadec, Rapa and Juan Fernandez Islands). In the Kermadecs, they breed in the southern group on Macauley and Curtis Islands, and possibly also on Hazard and Cheeseman Islands. Throughout their range,

White-bellied Storm Petrels migrate northwards into the tropics after the summer–autumn breeding season; however, birds have been caught on Macauley Island in September and on Curtis Island in October–November, and so some birds remain close to their breeding colonies. They are rare vagrants to waters off the New Zealand mainland at any time of year, with only eight records (three beach-wrecked) as far south as off Farewell Spit.

Population: Nothing is known about the size of New Zealand colonies, but the Roach Island colony is of 1000+ pairs.

Conservation: Protected native. Little is

known of the status of New Zealand populations.

Breeding: Apparently breed in late summer and autumn as on Lord Howe Island; a freshly hatched chick seen on Curtis Island on 21 May 1982 is the only confirmed breeding record in New Zealand. From the age of the chick, it is likely that eggs are laid in March–April. They lay 1 white egg in a crevice, short burrow or small caves. No information on incubation or fledging periods.

Behaviour: Silent in the air, but on the ground they give a soft twittering call and a high-

pitched whistle – 'pee-pee-pee...' – repeated 20 or more times.

Feeding: Diet is planktonic crustaceans and small squid, taken from the surface while flying or pattering on the water.

In the hand: White-bellied Storm Petrels can be distinguished from the few Black-bellied Storm Petrels that lack a central black stripe down the belly by having the feet extending to about the tip of the tail (but not c. 10 mm beyond) and by having dark bases (not white) to their throat feathers.

Reading: Lovegrove, T.G. 1978. *Notornis* 25: 291–298.