

extinct in about 1965 when ship rats reached its last refuge on Big South Cape and Solomon Islands off south-western Stewart Island.

Recently a fourth, as-yet-unnamed species, identified from sub-fossil and skeletal remains, has been added to the list. From its teeth, skull and foot bones it appears it was the largest of the short-tailed bats and had evolved furthest along the path toward a terrestrial habit. It probably became extinct some hundreds of years ago after the arrival of the Maori and their Polynesian rat, kiore.

Maori did not differentiate between bat species and called all of them "pekapeka", a diminutive of "peka", the name given to the fruit bat of their Pacific island homeland. In an ancient Maori proverb bats were associated with the mythical, night flying bird hokioi and were meant to foretell death or disaster.

MUCH of our current knowledge about bats is due to the work of Mike Daniel, a recently-retired DSIR ecologist, whose research has spanned 20 years. During the late 1970s and early 1980s his work on bat distributions was helped by the public

who sent in nearly 300 responses to appeals for information about sightings.

For the last 11 years Daniel has conducted the only long-term behavioural studies on bats – on the lesser short-tailed populations on Codfish Island and in Omahuta kauri forest in Northland.

On Codfish Island he has used mist nets to capture bats and then attached tiny transmitters weighing only one and a half grams (but ten percent of the weight of the animals). He found that the bats flew 30 to 40 kilometres in a night and alternated roost sights between favoured trees.

Also useful in his research were ultrasonic bat detectors which pick up the sounds – inaudible to humans – emitted by bats during echolocation.

Infra-red night-vision telescopes and binoculars, the latter used by the British in the Falklands War, have enabled him to observe bat behaviour. Lesser short-tailed bats burrow into leaf litter and humus in search of food and can excavate tunnels for roost sites in rotting trees.

Such behaviour is unique among bats, and the species has evolved wings which can be tightly folded into a protective pouch formed by leathery wing membranes and a skin flap on the side of the body – adaptations which make it much

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▲ Because they spend a lot of time on the ground, lesser short-tailed bats are particularly vulnerable, like New Zealand's flightless birds, to introduced predators such as stoats, rats and feral cats.



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A. H. WHITAKER

The long-tailed bat. Both this and the lesser short-tailed bat are about the size of a sparrow. The long-tailed bat is slightly smaller with rounded ears and a distinctive long tail almost as long as its body.

easier to hunt on the forest floor.

Daniel has found that despite their relatively heavy feet, lesser short-tailed bats still retain impressive powers of flight. On Codfish Island he has watched them flying at night through tightly-packed forest at around 20 km an hour. Even in rain they are able to receive the echoes of rapid pulses of high frequency sound emitted from the mouth, and cruise comfortably through the maze of twigs and branches to catch flying insects.

Over the past five years Daniel has discovered that the Codfish Island bats are lek breeding, a courtship behaviour shared among bats with only two African species. Like Codfish Island's other lek breeders, the kakapo, male bats gather