NO FLY ZONE

THE EVOLUTION OF FLIGHTLESS BIRDS

BY MATT J. SIMMONS

Wayne Lynch/All Canada Photos

Startled by a boat, the rhinoceros auklet beats its short wings, clumsily trying to take flight. The others around it simply dive under the water and swim — the auklets' real strength. Every year, the birds nest on a tiny chain of islands on Canada's northwest coast, the Lucy Islands, where they fling themselves headlong into sand banks rather than attempt a landing. As relatives of the extinct great auk, auklets are on an evolutionary path to giving up flight. The great auk — the "penguin" of North America — walked when on land but, like the auklet, preferred water. It never flew.

Flight, obviously, does not make a bird a bird. The auklet, for one, is a poor flier and plenty of birds are flightless: think

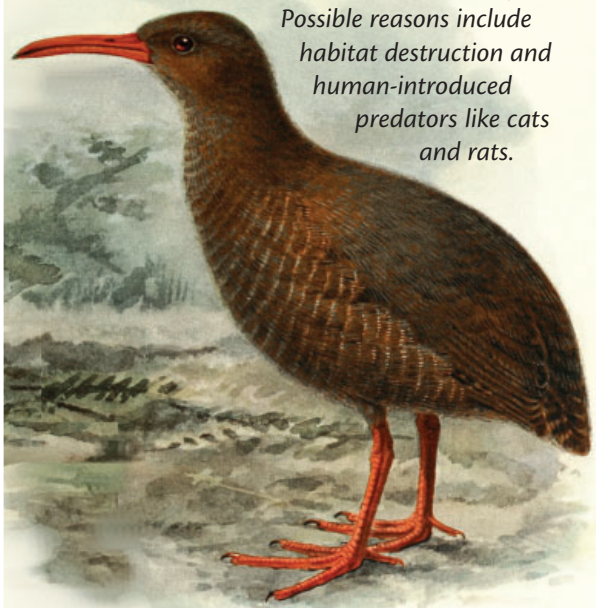
AN AVIARY WITHOUT WALLS

New Zealand has more flightless birds than any other country in the world. "If you grow up in New Zealand," says Mike Dickison, "you have an ingrown interest in flightless birds." Even New Zealand's national bird — the kiwi — is confined to the ground.

Here are just a few of New Zealand's other flightless residents, past and present.

CHATHAM RAIL (EXTINCT)

New Zealand is home to many species of rail, but has also lost many to extinction. The Chatham rail went extinct in 1900. Why? Possible reasons include habitat destruction and human-introduced predators like cats and rats.



Chatham Rail: Public domain Moa: Courtesy John Meghan, PLoS Biology

ostriches, for a start.

"Flying is a real drag," says Mike Dickison, a New Zealand ornithologist known internationally as the giant flightless bird guy. "Any chance birds get, they go flightless."

Why do birds stop flying? Some birds give up flight to use less energy. Flight, says Dr. Dickison, is "expensive." Birds like auks and auklets shun flight to specialize in other ways — flying through water instead of air.

"There are really two quite different categories of flightless birds," says Alan Feduccia, an evolutionary biologist at the University of North Carolina. "Water wing-propelled fliers and terrestrial (land) flightless birds."

Penguins are a good example of a water flier. On land, they're comical — waddling and tobogganing around ice floes like unsteady toddlers in tuxedoes. But in the water they are quick, agile, and graceful. Using their wings like flippers, penguins fly through the water as effortlessly as other birds fly through the sky. This adaptation has left them grounded, yet better at exploiting their environment.

Other birds give up flight because of their habitat and become a land species. On isolated islands like the Galapagos, Hawaii, and New Zealand, food is readily available at ground level and to avoid their predators — often other birds — it made more sense to avoid the air. As humans started exploring the world, however, they introduced new predators in the form of cats, rats, dogs, and other mammals, and many of the flightless island birds went, as the saying goes, the way of the dodo.

Speaking of which, what's up with the dodo? A famous example of human-caused extinction, the dodo was a giant flightless pigeon that stood about a meter tall (its head could have rested on a kitchen counter). The dodo lived on the island of Mauritius without ground predators until humans arrived in the 1600s. Mammalian predators — humans and their animal entourage — proved too much for the relatively defenceless bird.

While the dodo and the great auk now exist only in museums and books, other flightless bird species are still with us. And current research is turning up some interesting evidence about the evolution of flightless birds.

"There is a considerable body of research showing that the flightless condition can evolve *very* quickly, especially on islands," explains Dr. Feduccia. "Such evolution was previously thought to involve very long periods of geologic time. Such an evolutionary process normally involves arresting development at an early stage so that the adult is in reality a *large chick*, and very little genetic change may be necessary for this dramatic transformation."

What difference does flying or not make? Abandoning flight frees up birds to do amazing and weird things, Dr. Dickison says. Plus, he adds, flightless birds are the closest humans will ever come to meeting dinosaurs. "Giant flightless birds are like dinosaurs," he laughs. "And that's very cool."

DOMESTIC BIRDS

Farm turkeys and chickens are semi-flightless birds grounded in part because of domestication — humans bred the birds for food, with big meaty breasts and small wings. They have the instinct to fly, but are generally too fat to get off the ground.

Paul Tessier

Little Penguin: Courtesy Tanya Dropbear

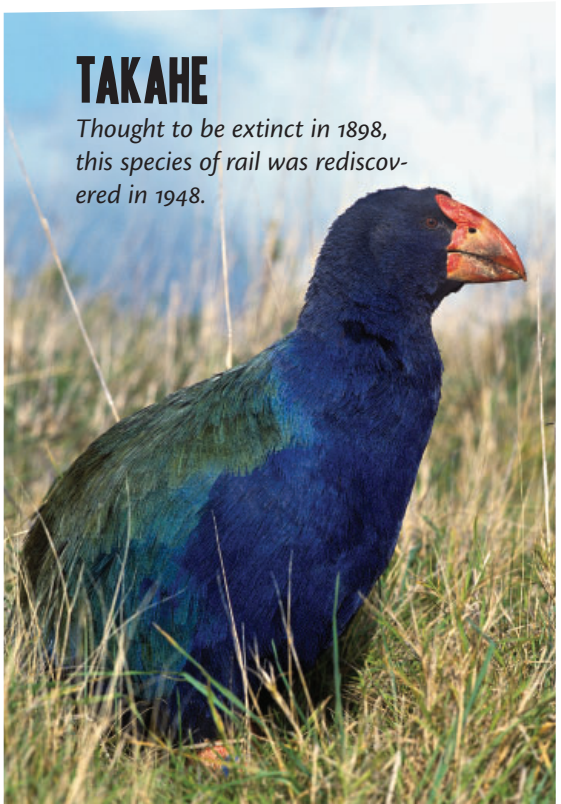
Takahe: Gerald Cubitt/NHPA

MOA (EXTINCT)

Until humans arrived, the moa's only predator was the equally giant Haast's eagle.

TAKAHE

Thought to be extinct in 1898, this species of rail was rediscovered in 1948.



LITTLE PENGUIN

Also known as the "fairy penguin," the little penguin typically grows to just over 40 cm tall.