

## TRAVELOGUE

## Stephens Island: Land of “Lizards”

Jennifer Germano

Zoology Department, University of Otago, Dunedin, New Zealand

I took one big leap and let out a sigh of relief when my feet hit solid ground. I dropped my bag and turned around to help unload supplies as they were tossed off the boat that had just brought us from the little village of French Pass, New Zealand. Stephens Island lacks a proper wharf, just a bit of rock that sticks out into the ocean, so landings can be quite a challenge when the sea is rough. From our landing site, we carried our gear up a narrow track and put it in a trailer that would be winched up the hill. All of the gear would be placed in the rat-free room until we could check it for rodents trying to hitch a ride to this predator-free island. Not counting marine life, the only native mammals found in New Zealand are two species of bats, but numerous other mammalian species that have been introduced either purposefully or inadvertently have wrought havoc on this island nation's wildlife. For many endemic species, predator-free islands such as Stephens are one of the last safe refuges.

Every ecosystem seems to have its own battle with invasive species. In the States, Honeysuckle, Kudzu, Zebra Mussels, and pretty much everything in south Florida has taken advantage of hospitable conditions and the absence of predators and competitors, but nowhere are ecosystems more vulnerable to the effects of invasives than on islands. Perhaps that is why the fauna of island nations such as New Zealand have been so devastated by the introduction of nonnative species.

Because Stephens is a scientific reserve administered by the New Zealand Department of Conservation (DoC), access is restricted to researchers and DoC personnel in order to protect the island's unique wildlife. After a hike up the steep hill to the hut, we certainly got the impression that the conservation measures were working. With every few steps, we noticed a rustle in

the grass or a glimpse of a tail just as it was disappearing. The place can almost be considered a temperate version of the Galápagos, with Fairy Prions (*Pachyptila turtur*) instead of Boobies and Tuataras (*Sphenodon punctatus*) instead of Marine Iguanas. Wildlife is everywhere, and much of it is endemic to New Zealand. Sea Lions rule the beaches and sea birds such as “titi” (Sooty Shearwaters, *Puffinus griseus*) and Fairy Prions fly in from the ocean at night. Three kinds of “weta” (giant nocturnal cricket-like insects in the family Stenopelmatidae) inhabit the forest and little Blue Penguins (*Eudyptula minor*) hop up the hill every evening after they return from the sea. The summit of the island holds a rock bank that is home to Hamilton's Frog (*Leiopelma hamiltoni*), perhaps one of the most endangered frogs in the world. Despite all of these marvelous creatures, however, Stephens Island is truly an island of reptiles. With four species of skinks, three types of geckos, and the largest colony of Tuataras in the world, the entire island seems to be ruled by “lizards.”

Stephens Island has no shortage of researchers. I was there for a week to help one of them, Jo Hoare, set up a radio-tracking project to study the behavior of Marlborough Green Geckos (*Naultinus manukanus*). As I walked up the steep trail that zig-zagged its way up the hill, Jo pointed out a few of the island's landmarks — the trail that led down to Queen's Beach, the winch house which was spewing smoke as the ancient piece of machinery groaned and pulled our gear up the slope, the old sheep-shearing barn converted into a lab known as the Palace. All the while, though, I was staring at the ground, trying to catch a glimpse of what was rustling in the clumps of tussock along the path. We stopped for a moment to catch our breath (nothing on Stephens is flat and the trails are often narrow and



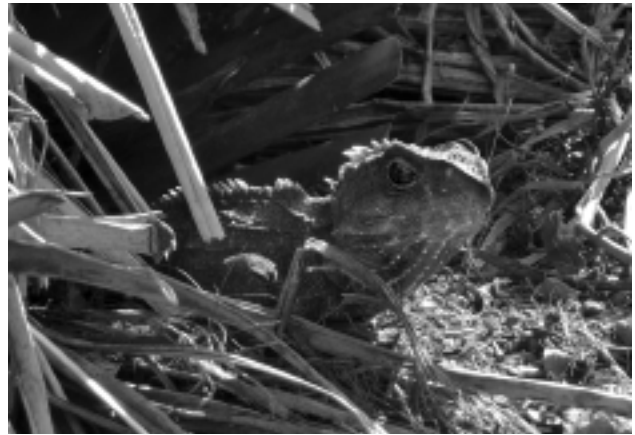
Stephens Island from the air. Photograph by Jo Hoare.



Location of Stephens Island, New Zealand. Graphic by John Binns.



Fairy Prions (*Pachyptila turtur*) are one of many species of sea birds found on Stephens Island. They often nest in burrows not far from the Tuataras that have been known to eat their chicks. *Photograph by Jo Hoare.*



A Tuatara (*Sphenodon punctatus*) outside its burrow. Although primarily active at night, Tuataras occasionally may be seen during the day. Unlike most of the lizards that they superficially resemble, they tolerate very cool temperatures. *Photograph by the author.*



A Common Skink (*Oligosoma nigriplantare*) pauses before escaping into the grass. *Photograph by Jo Hoare.*



A “weta,” this giant cricket-like creature is one of New Zealand’s largest insects. *Photograph by Phil Bishop.*

filled with holes from the Tuatara and Fairy Prion burrows) and Jo motioned for me to go ahead. That was when I spotted my first Tuatara, sitting in the middle of the path with its crest proudly erected. It stared at me for a moment and only when I approached very closely did it scuttle into the safety of the grass. Amazed, I walked on and smiled as I saw another Tuatara basking only a few meters farther along the track. With up to 2,000 Tuataras (or “tuts” as they’re commonly called) per hectare, Stephens Island is truly a herpetologist’s paradise.

Due to its split from Gondwanaland some 80 million years ago and the fact that mammals arrived only during the last 1,000 years, no mammalian predators are present, and New Zealand consequently has one of the most unique herpetofaunas in the world. A number of New Zealand’s species have been called “living fossils,” species that have changed little from their extraordinarily ancient origins. These include the Tuatara and all four of the native leiopelmatid frogs, the most endangered of which lives on Stephens Island. In addition to these ancient species, the lizards have their own unique adaptations, including a number of skinks and geckos that are livebearers.

Within an hour after disembarking from the boat, I was climbing trees with a radio receiver in hand trying to find the

first of Jo’s telemetered geckos. Marlborough Green Geckos have reached such a level of camouflage that they are almost undetectable on the leaves of the native bushes. Their color, in addition to the fact that they move very little — and very slowly when they do creep from leaf to leaf, makes them perfectly adapted to a world in which the main threat comes from avian predators. Jo, a Ph.D. student at Victoria University, is studying these geckos in the presence and absence of introduced predators to see if the threat of mammals such as stoats, ferrets, and rats has affected their basking behavior. After locating the first gecko basking happily on top of a tree, we decided that the transmitter attachment wasn’t having any ill effects on the gecko’s movements. This meant that Jo could proceed with her project and we set off to catch four more geckos. This was easier said than done, as it took nearly an hour with five people searching to locate the next two geckos that would be tracked for the study.

We attached transmitters to the geckos using a sort of backpack made of colored gauze and bandage tape with the transmitter’s antennae trailing along the back and tail of the lizard. We released the lizards where they were caught and monitored their movements among the trees every hour for the next week.

The fact that these geckos move very little, if at all, made our job a bit easier, and gave me plenty of time for spotting skinks and Tuataras along the trails.

Most of my days on Stephens consisted of tracking Green Geckos, which went fairly smoothly until we decided to attempt tracking one of the nocturnal Common Geckos (*Hoplodactylus maculatus*). While the Green Geckos spend most of their time on leaves and tree branches, making them perfect candidates for the use of external transmitters, the Common Geckos tend to wedge themselves under rocks, in crevices, or between boards — and this one was no exception to the rule. A day after releasing him, he ended up with nearly fifty other geckos in between the boards that held up the roof of the old woodshed behind the former lighthouse keeper's home. Staring into the eyes of a dozen geckos peering at you from under the sheetmetal roof made it

rather clear that observing only one gecko was going to be quite difficult. It also meant that the possibility of the transmitter getting jammed or coming off was anything but remote. Jo ended up abandoning this portion of her project after I left, focusing solely on Green Geckos.

Each night, as we were finishing dinner in the old lighthouse keeper's home that now serves as a field base for researchers, scientists studying the nocturnal critters of the island donned their headlamps and headed out into the dark. Feeling fairly awake, I decided to join some of them and set off to the island's highest point to help with the Hamilton's Frog census. As I mentioned earlier, Hamilton's Frog is New Zealand's most endangered frog, with only 200–300 individuals occupying a 600-square meter rock pile on Stephens. The trail to the top of the island is narrow and winding and bordered on either side by



A young Marlborough Green Gecko (*Naultinus manukanus*) basking on a leaf. *Photograph by the author.*



An adult Marlborough Green Gecko (*Naultinus manukanus*) with a radio-transmitter backpack. *Photograph by the author.*



A Tuatara (*Sphenodon punctatus*) perched above the trail at night. *Photograph by Jo Hoare.*



A nocturnal Common Gecko (*Hoplodactylus maculatus*) searches for prey in the dark. Photograph by the author.



A Hamilton's Frog (*Leiopelma hamiltoni*) emerging from the rock piles at night. Photograph by the author.

trees and bushes and the occasional stinging nettle. Unfortunately for me, it had started raining during dinner — great for frogs, not so good for dirt tracks. Halfway up the steep hill, with the Fairy Prions attracted by our headlamps and flying into our heads, I managed to slip and fall into a patch of nettles. Now, this stuff is unlike anything I've ever encountered in the States. No itchy red rash like Poison Ivy, no visible thorns or prickles to remove — but the minute you touch it, you know. My whole hand swelled up and I felt a burning sensation run through my fingers. The good thing about working with biologists is that they have a pretty good understanding of their environment, and within a few minutes someone had found a local plant, whose leaves we crushed and rubbed all over my hand to numb the pain. It wasn't entirely adequate and the strange tingling feeling in my hand persisted for nearly a week, but it was bearable.

After the nettle incident, I managed to make it up to the frog bank. A series of boardwalks have been constructed to crisscross the giant rock pile where the frogs live, allowing researchers to monitor the population without the danger of squashing frogs. In addition, a giant fence has been constructed around the rock pile to keep the Tuataras out. Crazy to think, but this is one of the few places where one rare species must be protected from being eaten by another. We did find one young tut that had managed to sneak in among the rocks, no doubt a bit fuller from a feast of frogs. He was caught and placed in a bag so he could be relocated outside the frog bank.

We moved slowly along the boardwalks, crawling on our hands and knees trying to catch a glimpse of the frogs. Unlike most frogs, the native species of New Zealand don't call. One of the most primitive frogs in the world, they lack eardrums and can't hear. Researchers believe that they communicate more like salamanders than other anurans, using some form of chemical communication to differentiate between kin and non-kin, male and female, and the size of other individuals. In addition, these evolutionarily peculiar frogs breed without water and, although it has yet to be confirmed in the wild, males in captivity tend to the young by guarding the eggs and later carrying the little froglets on their backs. We managed to catch nearly a dozen of these frogs, all of which were put into plastic containers until



The lighthouse on Stephens Island guides boats through the Cook Strait. Mount Taranaki on the North Island is visible in the background. Photograph by Phil Bishop.

they could be weighed, measured, and photographed before being released at the original site of capture.

After a long night of frogging, we made the hike back down the hill to the hut. The fog had rolled in from the sea, but you could still see swarms of seabirds flying through the headlamps' glare. They were so close that you could smell them and feel their wings beat as they flew past. Others made it a bit closer than that and occasionally you would look up just in time to see a Fairy Prion fly right into your face before crashing onto the ground, where it would wobble around, searching for its burrow.

After a few nights of frogging and one full night of sleep (although sleep is hard to come by in a hut that is constantly being bombarded by seabirds..... earplugs would be highly recommended to any future travelers to Stephens), I decided that the time had come for a night out with the Tuatara team. Led by Nicola Nelson of Victoria University in Wellington, the tut team spends months every year monitoring the breeding population of Tuataras on Stephens Island. Armed with PIT-tags, flashlights, and some pretty heavy-duty Pesola scales (although you must remember that this is coming from someone who



A Tuatara (*Sphenodon punctatus*) in front of Stinging Nettle (also known as “ongaonga” in New Zealand). Photograph by Jo Hoare.

works with skinks and frogs that you can easily hold in one hand), we split into groups and moved into the fields that were until recently grazed by sheep. DoC removed all of the remaining sheep from the island within the last year, although the female Tuataras seemed to prefer the unnatural short grassy fields to the forests. Despite this, they still tend to move out from the bush each night to dig their nests in the dirt of the old paddocks.

Surprisingly, Tuataras aren't that hard to catch. Just like a snake, you grab them right behind the head in hopes that they won't turn around and bite you with their three rows of teeth



The author successful in her search for nesting Tuataras (*Sphenodon punctatus*). Photographer unknown.



A Tuatara (*Sphenodon punctatus*) making a meal of a “weta.” Photograph by Phil Bishop.

(one on the lower jaw and two on the top, a feature that distinguishes Tuataras from iguanas and other lizards). Once you have them in hand, they generally remain calm and tolerate being weighed and tagged without too much of a fuss. We spent the rest of the night walking transects through the fields and catching any females we encountered. Nests were marked with a bit of flagging tape and the females were checked for PIT-tags to see if they had been marked during a previous nesting year.

To observe these amazing creatures in their natural habitat was truly an opportunity of a lifetime. The tuts are the only living members of the Order Sphenodontia and, although they were once found throughout New Zealand, today they are limited to a handful of offshore islands. Unfortunately, perhaps because their eggs are laid in burrows on the ground, the mainland populations of these animals disappeared after the introduction of predators such as rats. Unlike lizards, Tuataras don't have visible ear openings and the young tuts have a “third eye” to collect extra UV-rays during the first few months of their lives. In addition, male Tuataras lack a penis, mating by passing sperm directly from cloaca to cloaca.

Tuts remain active through most of the night, preparing their nests, mating, and feeding on wetas and the unsuspecting chicks of seabirds that dig their burrows nearby. It takes nearly the whole night to finish the transects before heading back to the hut. Only a few hours of sleep for me and then I'm up early to pack my things. A helicopter brings supplies to the island once a week during the research season, and this is to be my ride back to the mainland. Unfortunately, due to the unpredictable New Zealand weather and a bit of persistent fog, three attempts were necessary before the helicopter made it to the island.

We lifted off from the grassy lawn next to the lighthouse and moved out over the ocean. I watched as Stephens Island disappeared in the fog behind me. A week is not enough time to spend in such an amazing place. Few people ever get a chance to see some of the exceptional creatures that live on the offshore islands of New Zealand. With visitors restricted to researchers and DoC staff, fewer still have the opportunity to visit Stephens. However, perhaps because of those restrictions, life goes on for the reptiles of Stephens Island — and I'll certainly never forget my little glimpse into their world.