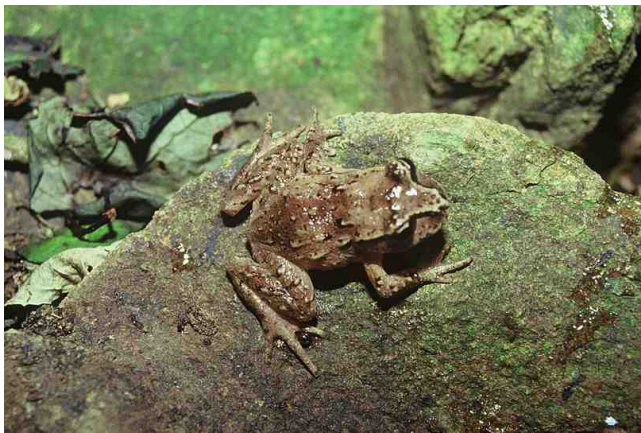


# Hamilton's Frog

*Leiopelma hamiltoni* (including *Leiopelma pakeka*)

## Lonely outposts



Hamilton's frog. DOC

## Quickfacts

One of the world's most primitive frogs

Now found only in the Marlborough Sounds

Could quickly become extinct if the frog-killer fungus arrives on their island homes

## Tiny stay-at-homes on island outposts

Hamilton's frog is now thought to have two races: the Stephens Island race and the Maud Island race. Previously these two races were classified as separate species, and the Maud Island race was named *Leiopelma pakeka* in 1998. Now scientists consider the Maud Island race of Hamilton's frog as an Evolutionary Significant Unit: a population that has been isolated from the main group of the species for sufficient time for genetic and physical differences to develop, but these differences have not yet developed to the degree which would merit them being named as a formal taxonomic group such as a new subspecies or species. Scientists have recently begun to use the Evolutionary Significant Unit as a classification because evolution is a process, not a sudden change, and it takes time after a group of animals or plants become isolated from their parent species to develop sufficient differences for scientists to name them as a new species. Some of these groups have only recently become isolated and so have very few differences from their parent species, others have been isolated for so long that they are on the verge of being considered a new species (or subspecies). Another New Zealand frog, Hochstetter's frog *Leiopelma hochstetteri*, is thought to have 13



Evolutionary Significant Units, all occupying different regions of the North Island. Several species of New Zealand reptile, including the tuatara, also show this pattern.

Before conservationists started to look after these frogs, the Stephens Island race lived in one pile of rocks on Stephens Island (Takapourewa) on the outer edges of the Marlborough Sounds and the Maud Island race occupied similar rocky habitats under the canopy of a forest patch on Maud Island (Te Hoiere). It is thought the frogs only managed to survive on Stephens Island as the rockpile near the island's summit trapped enough moisture to ensure the survival of a small group of frogs after most of the island's forest was cut down and burnt to allow the lighthouse keepers to farm sheep for food. These same lighthouse keepers also kept cats which are famed for causing the extinction of the flightless Stephens Island/Lyall's wren *Traversia lyalli* before anyone knew the birds were there. To spread the frogs further afield, a small group of 12 Stephens Island race frogs were moved to a specially-created 'frog pit' 40 m from their original home in 1991, and 40 frogs were moved to the predator-free Nukuwaiata Island in the Inner Chetwode Islands in the Marlborough Sounds in 2004. A fence was built around both the original site and the 'frog pit' to protect the frogs from being eaten by tuatara. The fences around these two sites were later connected to allow frogs to move the 60 m between these sites. Maud Island race frogs have been moved to a new site on Maud Island (100 frogs moved in 1984) and several other predator-free islands, all in the Marlborough Sounds, including 300 frogs moved to Motuara Island in 1997, 100 frogs to Long Island and 60 frogs to Zealandia in Wellington (both in 2006). The translocation to Long Island is thought to have failed, possibly because the island's little spotted kiwi *Apteryx owenii* may have eaten all the frogs.

There are only about 300 Stephen's Island race frogs. This makes it one of the rarest frogs in the world and it is classified as Nationally Critical. It used to be clearly the most endangered frog in the world until the frog-killer fungus started killing many of the world's frogs. The frog-killer fungus *Batrachochytrium dendrobatidis* (sometimes named the chytrid fungus) has spread throughout the world in a very short time, and has caused the extinction of a number of frog species. For a time it was feared that the frog-killer fungus would cause the extinction of New Zealand's endemic frogs after it was detected in New Zealand's endemic Archey's frog *Leiopelma archeyi* in the 1990's. It was also detected in some populations of exotic frogs in New Zealand. Luckily it has not infested Hamilton's frogs, probably because they are protected from the fungus's arrival by their island homes and by the strict biosecurity measures that ALL visitors to the islands must undergo. Frogs that are infected with the frog-killer fungus can be treated successfully by administering chloramphenicol, but this is not practicable for wild frogs. In the laboratory it has also been shown that naturally-infected *Leiopelma* frogs can recover from infection by this fungus.

The population of the Maud Island race is larger, about 40,000 frogs, and for this reason its conservation status is Nationally Vulnerable.

Hamilton's frog has not always lived on these two islands. Prior to people arriving in New Zealand, Hamilton's frog occurred between the Waikato in the North Island and Punakaiki in the South Island. Three other species of *Leiopelma* frog became extinct in New Zealand soon after people arrived.

New Zealand's *Leiopelma* frogs are unusual in many ways and are considered one of the most primitive of the world's frogs. One unusual feature is that the eggs are not laid in water, but in a moist site in similar places to their hiding sites and the male frog looks after the tadpoles and carries them on his back for several weeks until they become independent. It also has no eardrums, but does have tail-wagging muscles – despite not having a tail. The tail-wagging muscles are technically tongue-tyingly termed the caudalipuboischiotibialis muscles. The frogs tend not to move far and spend most of their life within a 5 m patch of ground.

Stephen's Island frog is listed at number 18 and Maud Island frog is listed at number 59 on the list of the top 100 EDGE amphibian species. EDGE stands for Evolutionary Distinct and Globally Endangered (or 'edge of extinction'), and identifies the most unique of the earth's biodiversity that is closest to extinction.

## What next?

A small captive population of the similar Archey's frog is managed in the specially-designed Carter Holt Harvey Native Frog Research Centre at Auckland Zoo, where successful breeding was recently achieved. The enclosures in the Centre have pipes of cold water flowing underground to keep the ground cool, a controlled climate that is warm and dry in summer and cold and wet in winter, and eggs that are abandoned are reared on damp tissue paper placed on the back of a frog model. If necessary, this centre can also be used to breed Hamilton's frog.

Mostly the protection Hamilton's frog needs is preventing new pests and diseases arriving on their island homes. To prevent against this their homes are protected as Nature Reserves where landing by unauthorised people is illegal and strict biosecurity measures are in place that all visitors to any of these islands must undergo.

## More information

Website: NZ frogs online. [Link](#)

Website: EDGE. [Link](#)

Website: Amphibian Survival Alliance. [Link](#)

News article: Zoo celebrates big leap forward for frogs. Auckland Zoo, 29 February 2016. [Link](#)

Strategic document: Native frog (*Leiopelma* spp.) recovery plan, 2013-2018. By Phillip J. Bishop, Lisa A. Daghli, Amanda J.M. Haigh, Leigh J. Marshall, Mandy D. Tocher and Kate L. McKenzie. Threatened Species Recovery Plan No. 63. Department of Conservation. 2013. [PDF](#)

Scientific paper: The threatened Leiopelmatid frogs of New Zealand: natural history integrates with Conservation. By Ben D. Bell. Herpetological Conservation and Biology, Vol. 5, pages 515-528, 2010.

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Article: The truth about tadpoles and frogs. By Warren Judd. New Zealand Geographic. Issue 038, April-June 1998.

Scientific paper: *Leiopelma pakeka* n. sp. (Anura: Leiopelmatidae), a cryptic species of frog from Maud Island, New Zealand, and a reassessment of the conservation status of *L. hamiltonii* from Stephens Island. By Ben D. Bell, Charles H. Daugherty, Jennifer M. Hay. Journal of the Royal Society of New Zealand, Vol. 28, pages 39-54, 1998.





# Photos



The original Stephens Island frog bank in the 1960's. DOC



The Stephens Island frog bank in the 1980's. DOC



Frog Bush on Maud Island. DOC



Boardwalk protecting fragile frog habitat on Stephens Island. DOC

This webpage represents the views of the Endangered Species Foundation of New Zealand and not necessarily those of other individuals or organisations involved in the conservation of this species.

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