

SRARNZ



New Zealand Lizards Conservation Toolkit

A resource for conservation management of the lizards of New Zealand



Compiled by:
Peter Anderson, Trent Bell, Simon Chapman & Keith Corbett

Compiled by Anderson, P.; Bell, T.; Chapman S. and Corbett, K. 2012. New Zealand Lizards Conservation Toolkit—a resource for conservation management of the lizards of New Zealand. A SRARNZ Miscellaneous Publication. Society for Research on Amphibians and Reptiles of New Zealand (www.srarnz.org.nz).
© SRARNZ 2012.

This publication was designed and produced by BioGecko Press (www.biogecko.co.nz).

This publication was supported by the New Zealand Government's Biodiversity Advice Fund (www.biodiversity.govt.nz).

Cover Image: North Cape green gecko, *Naultinus* spp. Photo: Trent Bell.



SRARNZ

New Zealand Lizards Conservation Toolkit

A resource for conservation management of the lizards of New Zealand

2012

Compiled by:

Peter Anderson, Trent Bell, Simon Chapman & Keith Corbett

PRODUCED WITH SUPPORT FROM:



CONTENTS

INTRODUCTION

About SRARNZ	5
Foreword	6
How to use this resource	7
New Zealand lizards - an overview	8
Conservation status	9
Conservation threats	10

SECTION ONE - Lizards and the Law

Lizards and the law	17
Statutory obligations and legislation	18
Wildlife Act 1953	20
Resource Management Act 1991	20
RMA flowchart	25
Resources	26

SECTION TWO - Surveying and Monitoring

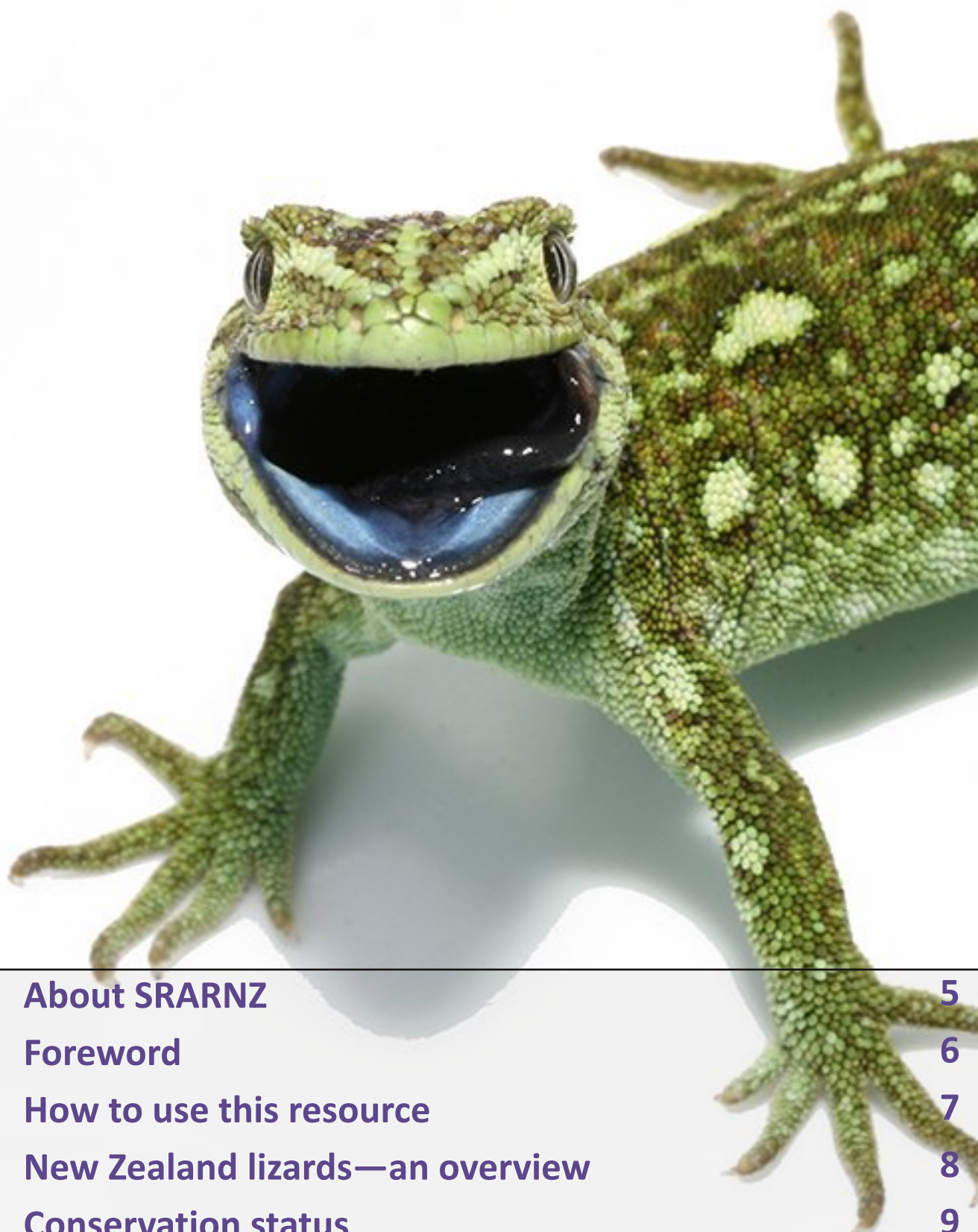
Surveying and monitoring native lizards	29
DOC's Inventory and Monitoring Toolbox	29
Why survey or monitor lizards?	30
Planning surveying and monitoring programmes	30
Surveying	32
Monitoring	33
Tools of the trade	33
Data collection	36
Submitting locality records to DOC	37
Data analysis	37
Marking techniques	40
Holding, handling and transporting lizards	42

SECTION THREE - Conservation Management

Conservation management	44
Conservation plans for native lizards	45
Predator and pest control	46
Habitat management	52
Translocations	57
Funding options	59

SECTION FOUR - Further Information

Information sources	62
Key contacts	63
Acknowledgements	65
References	66



About SRARNZ	5
Foreword	6
How to use this resource	7
New Zealand lizards—an overview	8
Conservation status	9
Conservation threats	10

West Coast green gecko, *Naultinus tuberculatus*. Photo: Trent Bell



About SRARNZ

The Society for Research on Amphibians and Reptiles in New Zealand (SRARNZ) is an organisation dedicated to the research and conservation of New Zealand's reptiles and amphibians. The objectives of the Society are to promote the scientific study of all aspects of the biology of the amphibians and reptiles of the New Zealand region and to promote the conservation of the region's indigenous herpetofauna. Membership of the Society is open to professional scientists, scientifically-interested amateurs and the professional staff of institutions engaged in the study of amphibians and reptiles in New Zealand. The Society was formed in 1987 and attracts many overseas as well as New Zealand members. SRARNZ members are kept informed through a newsletter, annual meetings, and a biennial conference which includes the presentation of scientific papers and a field trip to sites of herpetological interest.

For more information on SRARNZ, please visit www.srarnz.org.nz

About the SRARNZ logo

The logo selected for SRARNZ is one element of the famous "Opihi Taniwha" rock drawings. These Maori rock drawings, executed in charcoal on the roof of a low limestone overhang near the Opihi River (South Canterbury, New Zealand), are believed to be about 500 years old. Together the two elements are over 5 metres long and the artist, lying on the ground, would have been able to see only a small portion of them at any time. Lizards, especially geckos are animals of significance to Maori and the lizard form is often used in Maori art. The creatures in the "Opihi Taniwha" drawings appear to be stylised representations of reptiles; the broad head, wide body and coiled tail of the animal in the drawing used for the logo are suggestive of a gecko.

Foreword

PHILLIP BISHOP AND DAVID TOWNS

Over 25 years ago, SRARNZ was established for two reasons: to improve collaboration and facilitate research on amphibians and reptiles and to promote the conservation of this important segment of our fauna.

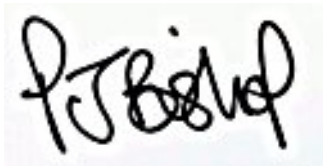
The first of these goals has seen particular success. SRARNZ members have embraced new technical advances, undertaken and funded research, and published many papers that have improved our understanding of the fauna. For species such as tuatara and some native frogs, the last two decades have also seen improvements in their long term prospects with their island habitats enhanced by the removal of invasive mammals. Some species of lizards have also benefited from this approach. However, unlike tuatara, our understanding of the size, relationships and threats faced by much of the lizard fauna is still evolving. We do know that there are more species of native lizards in New Zealand than there are of terrestrial birds and that the New Zealand lizard fauna is the largest for any equivalent temperate area on Earth.

Tuatara and two of the four species of native frogs are now largely confined to islands. They are thus largely protected through their isolation. Many species of lizards are found only on the mainland, they often compete for space with farming activities, and some extend their range to urban gardens. A few of the rarest species live in isolated habitat pockets in a sea of farmland, where they face a multitude of introduced predators. Others near urban areas face continuous habitat loss through suburban development and major construction projects as diverse as roads and wind farms. As a result of human activities over the last 800 years, tuatara, frogs and most lizards have undergone substantial range declines, two species of lizards have become extinct, and others are now endangered.

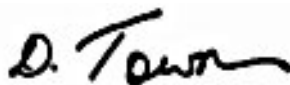
Because of threats they still face, the following toolkit focuses on native lizards. Often these threats have been the result of poor understanding of the significance of these animals, the legislation that protects them, and how we can act as advocates for populations under threat.

The information provided here has been compiled by SRARNZ members with support from the Biodiversity Advice Fund administered by the Department of Conservation. The toolkit is based on the principle that if people cause problems, they can also be part of their solution. This toolkit is thus aimed at the general public as well as agencies responsible for lizard conservation. It should help raise awareness of the extent of problems faced by the fauna as well as some ways they can be resolved.

We hope you find it useful.



Phil Bishop
President
SRARNZ



David Towns
Conservation Scientist
Department of Conservation

How to use this resource

The NZ Lizards Conservation Toolkit has been developed to provide information and resources to assist practitioners in the conservation and management of our native lizards. The Toolkit is divided into four major sections:

- The introduction highlights the diversity, conservation status and threats to native lizards.
- SECTION ONE outlines conservation and resource legislation in place for native lizards and their habitats, including interpretations of the law, and identifies best-practice requirements to satisfy this legislative protection.
- SECTION TWO provides a primer on standard methods for surveying and monitoring lizards.
- SECTION THREE provides resources on the conservation management of native lizards, including predator/pest control, habitat management and translocation practices that are known or likely to benefit our lizards.
- SECTION FOUR provides sources for further information in the literature, bibliographies and a contact list of experts.

The Toolkit does not attempt to prescribe specific and standardized management recommendations to fit all projects and situations. Rather, the Toolkit is constructed to inform people on various options and considerations, and to help them find further information and resources or expertise to assist them in developing the appropriate management and conservation actions. We have taken this approach because:

- Lizard species differ in ecology and intrinsic vulnerability to threats, and therefore management requirements may also differ;
- Issues and threats may differ in different situations or contexts; and,
- The sizes, scopes and scales of projects, situations, contexts and management options may vary.

In addition, what is currently regarded as best practice may change in the future. This may be a result of new developments in tools and techniques, improved understanding of management issues and solutions, and changes in standard operating procedures for wildlife management. Further, there may also be changes in government legislation and national policies. The Toolkit will be updated as these developments arise over time.

Conservation and management of native lizards requires flexibility and appropriate consultation with professional ecologists or herpetologists. It is for these reasons that the Toolkit refers to the Department of Conservation's (DOC) Natural Heritage Management System (NHMS), and other resources for further information, where appropriate.



Canterbury gecko, *Woodworthia brunnea*.

Photo: Trent Bell

New Zealand lizards — an overview

New Zealand is as much a land of lizards as it is of birds, since the number of endemic lizard species (currently 99 described and putative species) exceeds the number of endemic terrestrial and freshwater birds. Our lizards are considered remarkable for their diversity in terms of both number of species and types of ecological roles or niches, which often differ from those of lizards elsewhere in the world. The lizards of New Zealand have radiated widely, unlike most other New Zealand vertebrates. New Zealand probably has the most diverse lizard fauna of any temperate archipelago, even proportionately more than Australia relative to land area.

This diversity is largely due to New Zealand's long evolutionary isolation, geological upheaval and climatic stresses, resulting in high geographical and ecological diversity that has promoted rapid bursts of speciation in our lizards. Taxonomic research is still resolving the actual number of lizard species in our country. At present, only half of our lizard species are formally described, and ongoing taxonomic research and new discoveries continue to add new species every year. All of our native lizards are endemic to New Zealand; that is they occur nowhere else in the world. There is also one introduced species of skink from Australia.

In terms of New Zealand's biodiversity and ecological processes, native lizards are a critically important group. Representatives occupy almost all New Zealand's ecosystems: from the coast up to alpine levels and as far south as Stewart Island. This species diversity, ecological range and former abundance in pre-human times has led to the recognition that our lizards are critical for ecosystem processes and function. They have various generalist and specialist roles in ecosystems, including key roles such as pollination, honeydew feeding, frugivory and associated seed dispersal, and as predators and prey. Native lizards occur in exceptional abundance where released from introduced mammalian predation pressure, and are therefore one possible indicator group for ecosystem health in New Zealand.

However, our lizards have suffered extinctions and severe range declines. Native lizards have evolved without mammalian predators, and have not developed the abilities to cope with such predation. Furthermore, lizards are often put at risk by habitat loss and fragmentation via land clearance and development projects, such as those for infrastructure, agriculture, forestry, energy and mining industries. The unusual attributes of New Zealand lizards — such as slow growth rates (up to 8 years to maturity), long life-spans (some more than 50 years), low reproductive output and adaptation to the cold — mean many species have very slow recovery rates even within ecosystem restoration programmes.

Rough gecko, *Naultinus rudis*. Photo: Trent Bell



Conservation status

New Zealand lizards are unique in terms of endemism and evolutionary significance, highlighting their existence in New Zealand for at least 40 million years. However, their life history characteristics, behaviour, and the fact that many species are large, nocturnal and terrestrial puts them at risk from introduced mammalian predators, and many species have become extinct or near extinct on the mainland.

Of the 99 endemic lizard species, 68% (37 skinks and 30 geckos) are classified as 'Threatened' or 'At Risk' in the latest Threat Classification List for New Zealand reptiles (Hitchmough et al. 2010). Notably, the most frequent threat rank for our lizards is 'Declining' (27 species), often due to habitat losses and chronic predation by introduced mammals (see Figure 1 below).

Native lizards have undergone severe range contractions and extinctions across New Zealand. Fifteen species (15% of the fauna) with historical mainland distributions are largely restricted to islands today (i.e. extinct,

or nearly so, on the mainland). Losses have been far greater in the North Island (around 9 species compared with one in the South Island). However, there are more threatened lizard species in the South Island. Six lizard species, including the iconic grand and Otago skinks, have the same threat category as the kakapo, and a total of 17 lizard species are acutely threatened. Some species may persist in only one or two known populations, and only 22 species appear secure.

Ecologists have noticed remarkable changes in lizard abundance and behaviour following removal of introduced mammalian predators and habitat restoration, particularly on offshore islands. This has resulted in the recognition of previously unknown ecological roles for lizards. On the mainland, these functional roles have been effectively lost in many cases, because of range contractions and ongoing predation by introduced mammals, which is known to suppress populations or cause local extinctions. The dramatic recoveries of lizards upon mammal removal – and the extraordinary abundance of lizards on islands that have never had mammals – has provided strong evidence for the historical abundance of lizards and the key roles that lizards played in ecosystem processes and functions in prehuman New Zealand.

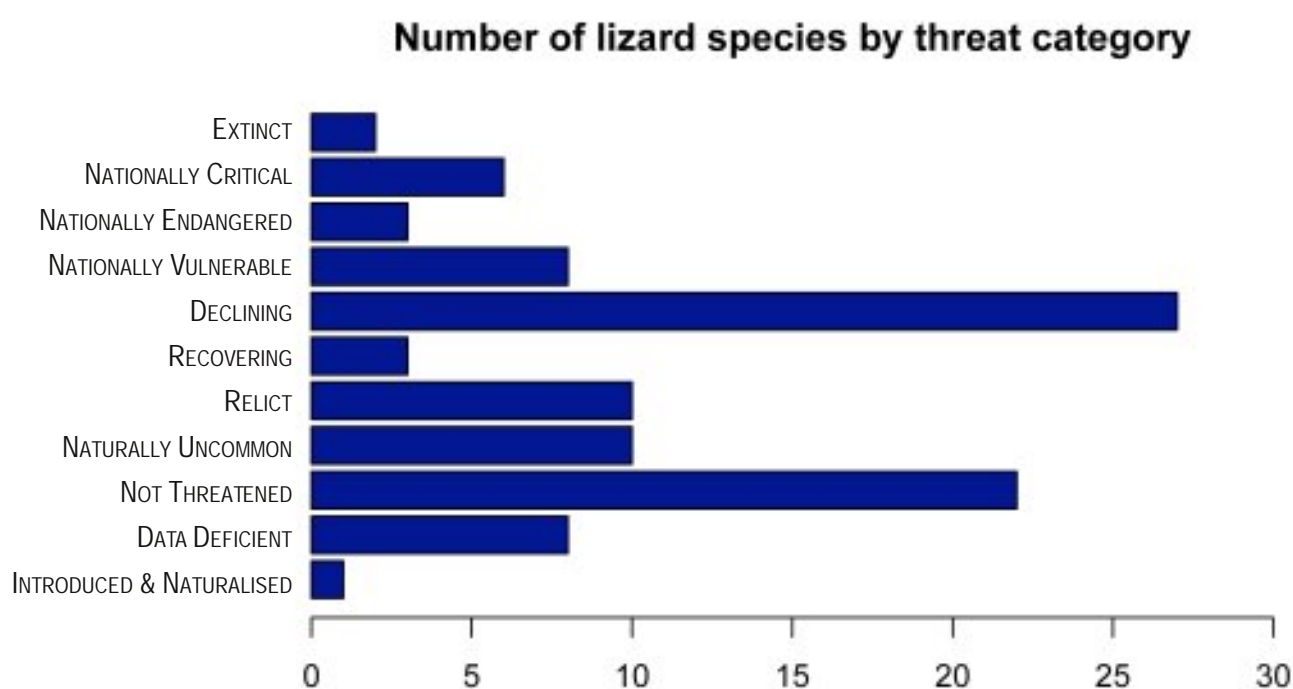


FIGURE 1: Threat categories defined by Townsend et al. (2008). Data source: Hitchmough et al. (2010)

Conservation threats

The decline of New Zealand lizards has largely been a result of recent human perturbations. These disturbances include introduced predators or pests, habitat destruction and habitat fragmentation. In this section, each threat is briefly described.

Introduced Predators and Pests

Introduced mammalian predators have had a very severe impact on our lizard fauna. These predators include mice, all rat species (ship, Norway and Pacific), all mustelid species (stoat, ferret and weasel), possums, cats and hedgehogs. These impacts are usually chronic, leading to the continuous and long-term decline of our lizards. For some lizard species, complete or regional extinction has occurred primarily due to this pressure, and other lizard species are found at unnaturally low abundance – even to the point of being virtually undetectable.



Partially eaten grand skink, *Oligosoma grande*.

Photo: Nathan Whitmore, DOC

Native lizards also suffer from indirect effects of the presence of introduced mammals. Pests such as rabbits and mice usually exhibit cyclical changes in their abundance over various timeframes. The changes occur in the form of population irruptions and subsequent crashes due to seasonal or yearly availability of food such as grass seeds, beech seeds and prey

species, along with periodic outbreaks of rabbit haemorrhagic disease. An increase in abundance of these pests may support higher numbers of higher level predators, such as rats, mustelids and cats. When the inevitable population crashes of their primary prey species occurs, the higher level predators switch to secondary prey species such as lizards, in some cases with acute and adverse effects on lizard populations.

Similarly, pest management activities which do not undertake 'integrated pest management' by controlling some but not all pest species risk triggering similar trophic cascades in the ecosystem (or, a 'knock-on' effect on the numbers of other predator species). Such trophic cascades may occur via competitive releases of mice and rabbits in the reduced abundance of higher predators.

Weasels, due to their small size, may be able to enter lizard refugia to consume defenceless lizards. This impact may be greater during winter where lizards are usually dormant.

Surprisingly, the hedgehog is one of the more insidious threats to our lizards. The hedgehog has long been considered a benign insectivore. However, scientists have recently realised that hedgehogs are effective predators of lizards. As hedgehogs have no predators themselves, they may be the most abundant pest in some parts of the country.

Possums are a likely to be a lizard predator. However, there is currently no known direct evidence of predation upon lizards by possums.

Rabbits, hares and pigs are destructive browsers of vegetation, and indirectly affect native lizards by altering or reducing the habitat complexity and availability. Native lizards utilize such habitat for cover, and forage for invertebrates and fruits within these habitats. Thus, the loss of such habitat may increase exposure of lizards to other predators.

Some introduced birds are also known to prey on lizards, including blackbirds and starlings. Other avian predators include the magpie, song thrush and kookaburra.

Predatory mammals—killers of our lizards

Cat

Cats (*Felis catus*, adult size range 1 kg to 6.25 kg) are a diurnal-nocturnal felid distributed throughout New Zealand, occupying most terrestrial habitats, from sand dunes to forest, and from the coast up to high altitudes. Both domestic and feral cats are highly effective hunters, with particularly sensitive hearing and vision. When conditions are favourable, cats can have three litters per year, with ~4 kittens per litter (range 1-10). They have large overlapping home ranges that differ according to habitat type or cat densities (~45 ha and up to 1900 ha) and have the ability to adjust their range areas according to prey abundance. Cats have been found with over 70 skinks in their stomach from a single hunting session, and it is not uncommon to find over 20 skinks in a cat's stomach.



Both domestic and feral cats are effective killers.

Photo: Rod Morris, DOC.

Ferret

Ferrets (*Mustela furo*) are large (adult size range 600 g to 2.7 kg, 52 cm long) nocturnal mustelids, distributed across New Zealand, usually in open, rough or scrubby areas. Their vision is relatively poor compared to cats, but their smell and hearing are acute. Female ferrets typically have one litter of 4-8 kittens (range 1-12) per year. Ferrets are primarily terrestrial hunters, but are poor climbers. Ferret home ranges range from 16 to ~370 ha. Studies of ferret scats in Otago found that 32% had lizard remains, and other studies around the country have found the frequency of lizards in ferret scats to range from 2-60%.



23 skinks found in one cat. Photo: Karina Holmes.

Stoat

Stoats (*Mustela erminea*, adult size range 205 to 800 g, 37 cm long) are the most widespread and abundant mustelid in New Zealand, occupying all habitat types from the coast up to high altitudes. Stoats are adept tree climbers and have been seen in forest canopies. They have excellent hearing and smell, and good night vision. Reproductive productivity in stoats is related to resource availability, but stoats have the potential for 6-13 embryos (mean = 9) per annual litter. Females can be mated as young as 2-3 weeks; in one instance a kit mated at 17 days, and later gave birth to 13 kittens. Home ranges are usually around 70-200 ha. Stoats are active diurnal-nocturnal hunters, and are one of the most lethal predators as they are highly opportunistic, often killing more prey than they can immediately eat. Because of their rapid metabolism, stoats need to feed frequently, up to five or six times per day, and also at night (generally 30-75 g/day per adult except for lactating females, who require up to 105 g/day). Stoats will increase activity times and range further at times of scarce food. In a study in inland Canterbury, 29% of stoat gut contents contained lizard remains.



Ferret. Photo: Konstanze Gebauer.



Stoat. Photo: DOC.

Weasel

Weasels (*Mustela nivalis*) are the smallest mustelid species in New Zealand (adult size range 60-210 g, 22 cm long). However, they are quite capable of killing prey 5-10 times their weight, such as rabbits. They hunt both by day and night, in rough country where mice may occur. They are capable of producing three litters per year (6.2 per litter, range 4-8), but this is rarely achieved, as weasel abundance is related to mice numbers. Weasel home ranges may increase to compensate for food shortages. Weasels generally require 20-40 g/day of food per adult, except for lactating females who require more.



Weasel. Photo: Keven Law.

Norway rat Norway rats (*Rattus norvegicus*) are the largest rat (adult size range usually 200-300 g, up to 450 g) in New Zealand. These rats are widespread but patchy in distribution, and are associated with watercourses, wetlands and rivers up to 1200m in altitude, although they are capable of living in any type of habitat. They have acutely-developed smell and hearing, and their night vision is excellent. Although they are more terrestrial than ship rats, they are capable climbers. They are competent swimmers, and this ability enables them to colonise offshore islands up to 2.2km away. Litter size averages 6-8 young, they breed year round and are capable of multiple litters per year (up to 33.5 young per female in one study). These rats tend to have small home ranges of 5-6 ha, but they have strong exploratory drives within this range. Lizards are part of their diet.



Norway rat. Photo: D. Garrick, DOC.

Ship rat Ship rats (*Rattus rattus*, adult size range usually 120-160 g, up to 225 g) are the most widely spread and abundant rodent species in New Zealand, occupying virtually all available habitat to densities of up to 6.2 per ha. They are exceptional tree climbers, and have been found in tree canopies. These rats have acutely-developed senses of smell and hearing, and their night vision is also excellent. Ship rats have strong exploratory drives in their home range, and have been recorded moving up to 700 m within their range area. They have high reproductive outputs, in producing 5-6 young per litter (1-3 litters within a season per female), adding up to a total of 18 young/female/season.



Ship rat. Photo: DOC.

Kiore (Pacific rat) Kiore (*Rattus exulans*, adult size range usually 60-80 g, up to 180 g) are largely restricted to offshore islands, usually without other introduced rat species. Kiore can occupy a wide variety of wet and dry habitats from grassland to forest up to 1300 m in altitude, and are agile climbers in forest. They are calculated to have up to 3 litters/year, and 19-21 young/year. Densities of kiore range from 6-170 per ha in grasslands and 10-80 per ha in forests. Removal of kiore on some islands has seen lizard numbers increase up to 30-fold over five years, and has resulted in altered lizard activity and behaviour. Kiore have caused local extinctions of some native lizards, based upon circumstantial evidence of disjunct distributions of several gecko and skink species, or sequential evidence of plummeting lizard numbers correlated with the time of arrival of kiore to islands. One study revealed that the presence of kiore skewed the demographics of a gecko population towards adults.



Kiore. Photo: Dick Veitch, DOC.

Mice Mice (*Mus musculus*, adult size range usually 15-20 g, up to 30 g) are distributed widely throughout New Zealand, up to 1300 m in altitude. Mice are mainly ground-dwelling but are capable climbers, and occupy all habitats from grassland up to subalpine tussocklands. They have excellent smell, hearing and vision. Mice have high fecundity, producing litters of 2-12 young (usu. 5-6) every 20-30 days. Young mice reach reproductive maturity in only 8 weeks, after reaching around 10.5 g in weight. Mice numbers sometimes irrupt (up to 50 mice per ha) when food availability is high during infrequent but heavy grass or beech seedfall years, a pattern which can be reinforced by continued breeding throughout the following winter. Mice are known to kill and eat lizards, with lizards comprising up to 20% of their diet at some times of year. A study on Mana Island recorded the population collapse of a rare skink species during a mouse irruption event, and subsequent recovery of the skinks upon eradication of mice.



House mouse. Photo: Florean Fortescue.

Hedgehog

Hedgehogs (*Erinaceus europaeus*, adult size range 400 g to 1.3 kg) are mainly insectivorous nocturnal animals, but recent studies have shown up to 28% of hedgehogs feed on lizards. They occupy habitats from pasture to podocarp-broadleaf forests, usually in lowland, drier parts of the country. Hedgehogs produce 2.7 young per litter on average and can produce two litters per year. Home ranges vary from 2 to 50 ha, and are greatest during spring and summer months, with males usually having ranges 2-3 times larger than females. These home ranges overlap with other hedgehogs, and densities up to 5.5 hedgehogs per ha have been recorded. They can disperse great distances overnight (averaging 900 m per night). Hedgehog road kills number 10-60 times more in New Zealand than in European countries, indicative of the higher densities here. By sheer weight of numbers, hedgehogs are now considered a serious predator of lizards.



Hedgehog. Photo: Don Merton, DOC.

Reference for this section:

King. CM 2006. *The Handbook of New Zealand mammals*. Second edition. Oxford University Press.

Native Predators

Native predators are unlikely to be considered a threat to the survival of established populations of lizards, except in very rare and exceptional cases, such as weka introduced to the Open Bay Islands, which put the Taumaka skink (*Oligosoma taumakae*) at risk of extinction. However, native predators of lizards may affect establishment of reintroduced lizard populations. Because of the conservation crisis of many native ground-foraging species and massive range contractions and extinctions of herpetofauna, there has been little research on predator-prey relationships between vulnerable native species that formerly co-existed.

The reintroduction of missing elements of fauna into ecological restoration projects needs to carefully consider the probable impacts on potentially vulnerable species, some of which may take decades or centuries to re-establish.

The major native avian predators of lizards include harriers, falcons, moreporks, kingfishers, cuckoos, weka, and pukeko. Other reptile predators may include tuatara and larger lizards. Invertebrates such as large centipedes and spiders have even been recorded preying on lizards. There may also be other native species which have not yet been recorded as lizard predators.



Goldstripe gecko, *Woodworthia chrysosireticus*. Photo: Trent Bell.

...conservation threats continued

It is also likely that introduced German wasps and ants have impacted upon lizard populations. However there is as yet no direct evidence of predation by wasps or ants in the wild, and research is required to assess what these impacts are and how great they may be.

Habitat Destruction

Habitat destruction is another major threat to our lizard fauna. Land development such as farming, horticulture, forestry, damming, mining and land subdivision for housing, have changed the landscape on a vast scale, and irrevocably destroyed a high proportion of the natural habitats that once covered New Zealand. Land clearance may also be related to infrastructure development projects, such as roading.

One of the major outcomes of habitat destruction is the direct mortality of lizards within their habitats at the time of destruction, causing localised population extinctions. Subsequent habitat fragmentation may then bring a whole new set of conservation problems (see below). Furthermore, livestock such as cattle and sheep often foul and degrade sensitive habitat remnants within pastoral land.

Habitat Fragmentation

A potential effect of habitat destruction is the risk of lizard populations becoming isolated from each other due to a lack of habitat between populations. Habitat destruction has the potential to effectively fragment populations, disrupt ecological processes (e.g. movement, feeding, reproduction, shelter and survival of lizards as part of an overall functioning ecosystem), and lower genetic diversity by inhibiting animal survival and dispersal in once continuous habitat.

Lizards are unlikely to cross boundaries with strong contrasts (e.g. pasture-forest) successfully. Thus, loss of population connectivity and heightened risks of localised sub-population extinction may be an outcome of habitat fragmentation. Factors in the localised extinction

of populations include the size of the habitat remnant, the distance to the nearest source population, and the time since isolation. For example, the extinction rate is expected to increase with decreasing remnant size, increasing distance between remnants, and increasing time since isolation.

When considering the combined effects of habitat destruction and habitat fragmentation, it is useful to remember that native lizards have very small home ranges and poor dispersal abilities and are unlikely to vacate areas targeted for development. Lizards do not flee from approaching machinery as they take refuge within their small home ranges, and unlike many birds, are unable to fly away from land development, or local ecological catastrophes such as fire or flooding. Their extremely low reproductive output means they are unable to recover quickly from population losses. Therefore it is essential to consider our lizards' ecological vulnerability, susceptibility and poor resilience to rapid land use changes in resource management planning.



Leucestic common gecko, *Woodworthia maculatus*. Photo: Trent Bell.

Toxic Chemicals

Toxins such as those used in pest control (for example, brodifacoum) may or may not have lethal or sublethal effects on lizards. There may also be adverse effects on lizards by chemicals used in the agriculture or horticultural industries, such as herbicides. However, very little is currently known and there is a strong need for research in this field.

Rainbow Skinks

Rainbow skinks (*Lampropholis delicata*) are classified as an Unwanted Organism both by DOC and MAF Biosecurity New Zealand. These skinks were accidentally introduced from Australia in the 1960s, and are established in the upper North Island, and have the capacity to establish further. They may pose threats to our native lizards via competitive displacement, and there exists a particular risk of rainbow skinks establishing on the ecologically important Hauraki Gulf islands. This is because they have a capacity to reproduce faster (laying up to 8 eggs three times per year, which is more than five times as fast as most of our native lizards). They can therefore reach high population densities in a relatively short time. It is illegal to knowingly move, spread, release, breed, display or sell rainbow skinks without permission from MAF Biosecurity New Zealand. Rainbow skinks now need to be considered in Regional Pest Management Strategies.

If you encounter rainbow skinks outside the currently known range (Kaitaia, Northland, Auckland, Waikato, Bay of Plenty, Whanganui, Palmerston North, or Foxton Beach), it is important that you immediately report any sightings. Contact the following:

MAF Biosecurity New Zealand
[0800 80 99 66](tel:0800809966)

Department of Conservation
[0800 DOCHOTline](tel:0800DOCHOTline) / [0800 362 468](tel:0800362468)

For further information on rainbow skinks:
www.doc.govt.nz/rainbowskinks

Wildlife Poachers

An ever-increasing threat to our lizard fauna is wildlife poaching for illegal international trade. Our lizards are popular in the international pet trade, especially in Germany and the USA. This has led to poachers visiting New Zealand and attempting to illegally harvest wild populations to smuggle out of the country.

To combat poaching, conservation managers, researchers, land owners and the general public need to be vigilant and report suspicious activity. If you see any suspicious activity in lizard habitat, monitor the activity of the suspected persons and, if possible, record the registration numbers of any vehicles with a description or photograph of the persons, then contact:

Wildlife Enforcement Group
[09 927 8427](tel:099278427) / [0292 726 043](tel:0292726043)
[09 927 8496](tel:099278496) / [0292 726 042](tel:0292726042)
weg@iconz.co.nz / weg@customs.govt.nz

Department of Conservation
[0800 DOCHOTline](tel:0800DOCHOTline) / [0800 362 468](tel:0800362468)



Rainbow skink, *Lampropholis delicata*. Photo: Trent Bell.