



**Society for Research on Amphibians and Reptiles in New Zealand (SRARNZ)**  
*presents*

## Reptiles and Amphibians of Otago

Otago is a large (31,251 km<sup>2</sup>) and lightly populated region of the southern South Island of Aotearoa New Zealand, stretching from the eastern coastline west to the Southern Alps. The earliest humans, of East Polynesian origin, arrived about 700 years ago. The largest settlement today is the coastal city of Dunedin (pop. >127,000), which grew from a Scottish influx in the 1800s. The Otago Regional Council administers the region, and tribal authority (mana whenua) rests with the iwi of Ngāi Tahu.

Climates in the Otago region (roughly 45°–47°S) range from changeable, cool-temperate conditions near the coast to the near-continental climates (baking hot summers, freezing winters) of the interior. The region provides varied habitats for herp species, including sand-dunes, grasslands, shrublands, wetlands, forests, rock structures and scree slopes, some occupied to at least 1900 m above sea level.

Today's herpetofauna is dominated by lizards (solely geckos and skinks), including about 10 described species. A further 12 or more undescribed taxa are recognised by tag names for conservation purposes, and we follow that approach here. All lizards in Otago are viviparous and long-lived, and remain vulnerable to ongoing habitat loss and predation by introduced mammals.

Species that have become locally extinct since human arrival include tuatara (recently reintroduced on a tiny scale). There is no recent fossil evidence of native frogs from the Otago; however,

leiopelmatid frogs survive elsewhere in New Zealand. Two species of introduced frogs are present, but there are no crocodylians, salamanders, terrestrial snakes or turtles. Marine turtles (mainly leatherback turtles, *Dermochelys coriacea*) visit the coastal waters of Otago but do not nest here.



Location of Dunedin indicated by red circle.

1: NASA Earth Observatory upload by Norman Kuring and 2: public domain by its author, Furius at the Wikipedia project.

**Important note:**

All of New Zealand's native herpetofauna is protected by the Wildlife Act 1953 and the Trade in Endangered Species Act 1989. **It is illegal to disturb any native frog, reptile, bird or other animal.** This means that you can look for herpetofauna during your visit to New Zealand, but cannot touch any native animal without a permit from the Department of Conservation (even for photography). Consequences of disturbing, possessing or smuggling wildlife in New Zealand include fines and imprisonment.

So please come and enjoy viewing our herpetofauna, but refrain from touching any animal. For further information on the laws regarding wildlife during your visit to New Zealand for this congress, please see: <http://www.doc.govt.nz/about-us/our-role/legislation/wildlife-act/>

**About the Society for Research on Amphibians and Reptiles in New Zealand (SRARNZ)**

SRARNZ (<https://srarnz.com>) is a society of mainly professional herpetologists whose aims are to:

- promote the scientific study of all aspects of the biology of the amphibians and reptiles of the New Zealand region
- promote the conservation of the indigenous amphibians and reptiles of the New Zealand region



Carey Knox

Scree skink (*Oligosoma waimatense*)

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Produced by Sophie Penniket, Carey Knox, Alison Cree and Phil Bishop on behalf of SRARNZ, January 2020.

## Reptiles

### Tuatara

*Sphenodon punctatus*

F. Sphenodontidae



Alison Cree

**Status:** At Risk – Relict

**Recognition:** NZ's largest and only crested lepidosaur, robust head, strong jaws

**Snout-vent length (SVL):** males up to about 300 mm, females up to 260 mm

- Only living member of Order Rhynchocephalia
- Two tooth rows in upper jaw, gastralia, no hemipenes (unlike lizards)
- Complete diapsid skull with proplinal jaw action (unlike early rhynchocephalians)
- Māori name (the same in singular and plural) refers to spines, largest in males
- Genus name refers to wedge-shaped teeth, species name to spots
- Distinctive in Māori culture and often considered a taonga (treasure)
- Found throughout much of NZ, including Otago, until a few hundred years ago
- Natural populations now just 32 islands in Cook Strait and off northeastern NZ
- Since 1995, released to nine restoration islands and five fenced ecosanctuaries
- Life span up to ~100 years is possible
- Egg-laying, with temperature-dependent sex determination
- Clutch size 6–9 eggs, egg incubation ~ 1 y, nesting every 2–5 y or less frequently

**Where to see:** display enclosure at Ōrokonui Ecosanctuary, a c. 20-min drive north of Dunedin.

## Jewelled gecko

*Naultinus gemmeus*

F. Diplodactylidae



Carey Knox

**Status:** At Risk – Declining

**Recognition:** An iconic and well recognised species, with bright green colouring and attractive patterning, often in diamond shapes

**SVL:** up to 87 mm

- Widespread, but very patchy distribution throughout Otago
- Also present in Canterbury and Southland (Codfish Island, and possibly elsewhere)
- Found from the coast up to ~1300 m asl
- Historical and ongoing loss of habitat through agricultural development and fires, plus predation, have resulted in disappearance from large parts of the former range
- Often arboreal, living among foliage of divaricating shrubs, vines, or trees; also present in snow-tussock grassland (*Chionochloa rigida*), but not rock-dwelling
- Primarily diurnal, and an avid, but often cryptic, sun basker
- Tail prehensile; males slightly shorter and in Canterbury populations often browner than females
- Photo-identification using pattern markings has helped to monitor local populations and to identify the source of illegally collected specimens
- Community management plan exists for the Otago Peninsula
- Females pregnant for about 7 months at low elevation; max. 2 offspring
- Can live at least 12 y in wild and 16 y in captivity, but much longer is likely

**Where to see:** display enclosure at Otago Museum, adjacent to the University of Otago. WCH tour to Ōrokonui Ecosanctuary.

## Kōrero gecko

*Woodworthia* “Otago/Southland large”

F. Diplodactylidae



Carey Knox

**Status:** At Risk – Declining

**Recognition:** A moderately large gecko; typically grey or brown in colour with bands, blotches or stripes in varying shades

**SVL:** up to 90 mm in some populations

- Distributed across much of eastern and parts of central and north Otago (also in Southland)
- Ranges from sea level up to at least 1300 m asl
- Predominantly rock-dwelling, but forages amongst small native shrubs (e.g. *Melicytus alpinus*) or dense vines (e.g. *Muehlenbeckia complexa*) at night
- Occasionally found under wood, in forest, or in human-made structures
- Primarily nocturnal, but will sun bask (especially females) at the entrance to a retreat
- May form large aggregations (30+) under highly suitable retreats
- Also known as the Otago/Southland gecko or Otago large gecko
- Vocalises (‘kōrero’ in Māori refers to talking or speech)
- Females often reproduce annually, but at least two cool, higher-elevation sites females reproduce biennially, with pregnancies of ~11-14 months; max. 2 offspring
- Known to live at least 30 y in the wild, but longer is likely
- Body size (size at maturation and maximum size) is larger in populations experiencing cooler microhabitat temperatures and at higher elevations

## Schist gecko

*Woodworthia* "Central Otago"

F. Diplodactylidae



Carey Knox

**Status:** At Risk – Declining

**Recognition:** Typically grey or brown in colour with bands, blotches, or stripes in varying shades (similar to korero gecko, but smaller)

**SVL:** up to 71 mm

- Found up to at least 1100 m asl
- Occupies the tors and outcrops of schist rock that characterise the Central Otago landscape
- Forages amongst small native shrubs or dense vines at night
- Primarily nocturnal, but will bask at retreat entrances during the day
- May form aggregations under suitable retreats
- Females reproduce annually, with pregnancies of ~4 months and 2 offspring
- Life span unknown, but likely to be several decades
- Like the kōrero gecko, a member of the species complex formerly known as the 'common gecko'; genus name until 2010 was *Hoplodactylus*

## Orange-spotted gecko

*Mokopirirakau* sp.

F. Diplodactylidae



Carey Knox

**Status:** Threatened – Nationally Vulnerable

**Recognition:** A medium-large sized gecko from alpine regions; brown-grey with lighter markings and often with orange or rust-coloured blotches

**SVL:** up to 92 mm in some populations

- Appears confined to mountainous areas of central and western Otago
- Known elevational range of 1150–1800 m asl
- Mountain habitat on steep upper slopes with extensive exposed rock, and snow cover for ~3–4 months per year
- Rocky habitats include alpine boulderfields, bluffs, scree slopes and / or loose rock aggregations
- Surrounding vegetation typically dominated by snow tussock (*Chionochloa rigida*), with a wide range of mat-forming plants and alpine shrubs growing around and between rocks
- A secretive, primarily nocturnal gecko, which is difficult to find
- A V-shaped marking on top of head between eyes, and a white stripe extending from eye to ear
- First discovered in 1998 and remains poorly known, although has now been found in five mountain ranges
- Genus name derives from Māori (moko pirirākau = forest gecko)
- Life history poorly known, but given its alpine habitat, a life span of several decades, and less-than-annual female reproduction with lengthy pregnancies, are expected

## McCann's skink

*Oligosoma maccanni*

F. Scincidae



Carey Knox

**Status:** Not Threatened

**Recognition:** Grey or brown in colour with blotches and/or stripes. In Otago, most individuals are blotched with a checker-board pattern, whereas in Canterbury most individuals have a prominent mid-dorsal stripe

**SVL:** up to 73 mm (largest in females)

- A very common skink species in the drier parts of the South Island
- Widespread from coast to mountains (to ~1700 m asl) in Otago; also present in Southland and Canterbury
- Abundant in a wide variety of habitats, including dry, rocky places and town/rural gardens. Generally, more commonly found inland and less prevalent near the coast
- Diurnal and an avid sun-basker
- Mid-dorsal stripe, if present, often broken, notched or wavy on tail
- Species name honours Charles McCann, author in 1955 of a booklet about NZ lizards
- Annual reproduction with pregnancies of ~3–5 months over summer
- Mating in autumn and sperm storage over winter
- Litter size varies with female SVL, but about 3 offspring
- Life span can reach 8 years in a Canterbury population
- A model species for ecophysiological studies

**Where to see:** Rocky areas in Central Otago. Look for skinks basking on schist rock tors or in tussock grassland.



## Southern grass skink

*Oligosoma* aff. *polychroma*; Clade 5

F. Scincidae



Carey Knox

**Status:** At Risk – Declining

**Recognition:** Pale straw-brown to grey-brown or mid-brown with numerous well-defined and generally smooth stripes on back and sides (usually including an outer-dorsal stripe); belly light grey-brown or dull yellow

**SVL:** 60-70 mm, rarely up to 80 mm

- Part of the grass skink/common skink species complex and not easily distinguished from other members
- Two colour-morphs occur in Otago. The striped morph is present at all sites. The Awarua morph in contrast is uniform dark brown, orange-brown or olive-brown all over with no markings other than a mid-dorsal stripe
- Distributed throughout much of Otago, also Canterbury, Southland and Stewart Island
- Found from the coast inland to c.1700 m asl
- One of the most commonly seen lizards, frequenting native and exotic grass habitats, as well as wetlands, shrublands, sand dunes, rock piles and occasionally gardens
- Generally, prefers damper microsites than McCann's skink, becoming restricted to stream-side vegetation and high elevations in the driest sites of Central Otago
- Diurnal and an avid sun basker
- Life span likely to reach at least 3–4 years
- Females pregnant for ~ 3 months over summer; ~3–6 offspring

**Where to see:** Present at Ōrokonui Ecosanctuary; relict populations in suburban Dunedin

## Otago skink

*Oligosoma otagense*

F. Scincidae



Carey Knox

**Status:** Threatened – Nationally Endangered

**Recognition:** a large, robust skink with dramatic markings (often blotches) of black and gold

**SVL:** Up to 130 mm

- One of NZ's largest lizards (can reach over 300 mm in total length)
- Once found over much of Central Otago, but today thought to inhabit only about 8% of the presumed former range. Localised extinctions have been recorded across much of the current range since the mid-1970s
- Those remaining in the wild are distributed between two main areas, a larger one in the east (including Macraes) and another in northwest Otago near Lindis Pass
- Associated with deeply fractured schist rock outcrops, typically in or close to gullies and surrounded by tussock-grasslands with fruiting plants
- Some overlap in habitat use with the grand skink
- A diurnal sun-basker
- Recent intensive control by the Department of Conservation of introduced mammalian predators at Macraes has led to population increases. Threat status consequently reduced from Nationally Critical to Nationally Endangered
- Females reproduce annually with pregnancies of 4–5 months over summer; small litters of ~ 2 offspring; sometimes seen in pairs or groups
- Can live over 20 years in wild and over 40 years in captivity

**Where to see:** outdoors display enclosure at Ōrokonui Ecosanctuary, a c. 20-min drive north of Dunedin. WCH tour to Macraes, c. 1.5 h drive north of Dunedin.

## Grand skink

*Oligosoma grande*

F. Scincidae



Carey Knox

**Status:** Threatened – Nationally Endangered

**Recognition:** A moderately large and slender skink with fine black and gold markings

**SVL:** Up to 115 mm (females largest)

- Geographical range similar to that of the Otago skink, with two main populations
- The eastern population (including Macraes) is much larger than the northwestern one, which is thought to be highly endangered
- Found on schist tors, predominantly on ridge tops and the upper edges of gullies, where they sometimes overlap with Otago skinks
- Diurnal and an avid sun-basker
- As with Otago skinks, distribution has been greatly reduced in recent decades, reflecting habitat loss and predation by introduced mammalian predators
- As with Otago skinks, recent intensive predator control at Macraes has seen populations increase in size
- Threat status has been reduced from Critically Endangered to Endangered as a result
- Females reproduce annually, with pregnancies lasting ~4-5 months over summer
- Can live at least 23 years in the wild and 30 years in captivity

**Where to see:** WCH tour to Macraes, c. 1.5 h drive north of Dunedin

## Green skink

*Oligosoma chloronoton*

F. Scincidae



Carey Knox

**Status:** At Risk – Declining

**Recognition:** A moderately large skink, typically green or brown on the back with prominent ocelli

**SVL:** Up to 110 mm

- The Otago form has a patchy distribution from coastal Otago through Central Otago and possibly further westwards; also present in North Otago and South Canterbury.
- There is another form of green skink in Southland and another on Stewart Island and its outlying islands. It is uncertain at this stage whether the green skink will be split into multiple species or not; currently undergoing taxonomic assessment
- This taxon appears to have declined substantially in the lowlands (e.g. no longer found on Otago Peninsula), but higher-elevation populations seem reasonably abundant
- Ranges up to at least 1720 m asl
- Found in damp habitats, typically with woody or rocky cover in the form of logs, rock piles, or loose slabs, such as stream/river/lake edges, gullies, shrublands, and tussocklands
- At high elevations occupies heavily vegetated scree edges and islands amongst scree and boulderfield, particularly between 1300–1700 m asl
- Diurnal and an avid sun basker, but can be cryptic and retreats quickly into cover when approached
- Life history poorly known, but probably similar to other taxa in the *chloronoton* or *lineocellatum* complexes

**Where to see:** Translocated to Ōrokonui Ecosanctuary, but unlikely to be seen

## Cryptic skink

*Oligosoma inconspicuum*

F. Scincidae



Carey Knox

**Status:** At Risk – Declining

**Recognition:** Red or chestnut brown through to very dark brown on the dorsal surface, often with black flecking on the head and back

**SVL:** Up to 75 mm

- Scattered across much of the damp parts of Otago, Southland, south Westland, and Fiordland, although multiple species may be present (taxonomic work is underway)
- Occupies tussock grasslands, scrublands, herbfields, sand dunes, wetlands, and rocky areas such as cobble beaches, boulder fields, screes, and bluffs
- Favours damp areas with complex ground cover, such as gully systems
- Sun-basks and forages amongst rock piles and dense low-growing vegetation; may climb up into dense shrubs up to 1 m high
- The black-flecking is not found in other skinks of a similar size and colouration e.g. McCann's skink and southern grass skink – so can be used to help recognise the species. Cryptic skink markings are more complex/wavy on the back and sides than the 'straight-lined' southern grass skink, and McCann's skink in Otago has distinctive checkerboard patterning on the back and no black flecks
- Reproduction poorly known

## Burgan skink

*Oligosoma burganae*

F. Scincidae



Carey Knox

**Status:** Threatened – Nationally Critical

**Recognition:** Light to dark brown on the dorsal surface, with irregular light or golden flecks. Often with black flecking on the head, sides, and/or back. Full or broken dark mid-dorsal stripe

**SVL:** Up to 70 mm

- A small rare skink restricted to inland Otago
- Only known from montane mixed woody-herbfield habitats in the Rock and Pillar Range and Lammermoor Range in eastern Otago, New Zealand
- Elevation range of 800–1400 m asl
- Prefers shrub habitats within tussock grassland
- The taxon was first studied in the early-mid 1980s, when it was relatively widespread, but more recent survey work suggests a severe decline in population size and distribution, particularly at lower elevations below 900 m asl
- Described in 2011
- Similar in general appearance to the cryptic skink, but the two species do not overlap in distribution and are genetically very different
- Surveys and monitoring are currently being undertaken with the aim of better understanding the status of the Burgan skink and to assess options for conservation management
- Able to tolerate extreme weather by retreating into burrows
- Females deliver up to 6 offspring in late summer

## Other lizards of Otago

Common name	Scientific name
Southern Alps gecko	<i>Woodworthia</i> "Southern Alps"
Kawarau gecko / Cromwell gecko	<i>Woodworthia</i> "Cromwell"
Short-toed gecko / Southern mini gecko	<i>Woodworthia</i> "southern mini"
Takitimu gecko	<i>Mokopirirakau cryptozicus</i>
Tautuku gecko	<i>Mokopirirakau</i> "southern forest"
North Otago black-eyed gecko	<i>Mokopirirakau</i> "North Otago"
Scree skink	<i>Oligosoma waimatense</i>
Lakes skink	<i>Oligosoma</i> aff. <i>chloronoton</i> "West Otago"
Nevis skink	<i>Oligosoma toka</i>
Oteake skink / North Otago skink	<i>Oligosoma</i> sp.
Rockhopper skink	<i>Oligosoma</i> sp.
Alpine rock skink	<i>Oligosoma</i> sp.

In addition, a large gecko thought to be Duvaucel's gecko (*Hoplodactylus duvaucelii*) is known from bones in North Otago, but is now locally extinct.



Carey Knox

Alpine rock skink (*Oligosoma* sp.)

# Amphibians

## Southern Bell Frog/Growling Grass Frog

*Ranoidea (Litoria) raniformis*

F. Pelodyadidae



Phil Bishop

**Status:** Introduced into NZ in late 1860s (Endangered in Australia)

**Recognition:** A large, robust, bright green and brown frog, usually with a continuous vertebral stripe on its dorsal surface. A pale ridge runs from behind the eye down the flanks as a skin fold. The large tympanum is obvious. The thighs and inguinal region are blue-green in colour.

**SVL:** males up to about 65 mm, females up to 90 mm

- One of three Australian species of frogs to become naturalised in NZ after being introduced in 1875
- Found throughout most of NZ, including Otago
- Loud growling-like calls during the NZ summer months (described as craw-crocrocrocrok)
- The fingers lack webbing whereas the toes are almost completely webbed
- There are no suckers on the ends of the toes or fingers
- Prominent warty skin
- Often seen basking in the sun around edges of ponds

**Where to see:** at many small farm dams around the South Island; in wet years they can be seen in the ponds at the base of the Pyramids (Riddell Road, Portobello, Okia Flat, Dunedin) a c. 40-min drive from Dunedin city centre along the Otago Peninsula.



## Brown Tree Frog/Whistling Tree Frog

*Litoria ewingii*

F. Pelodyadidae



Phil Bishop

**Status:** Introduced into NZ in 1875 (Least Concern in Australia)

**Recognition:** A small brown treefrog, usually with a continuous white stripe along the jawline from the armpit to the end of the snout. The dorsal colouration can vary from almost white to dark brown. The tympanum is obvious. The thighs are bright orange. The fingers and toes have suckers with only a small amount of webbing on the feet.

**SVL:** males up to about 30 mm, females up to 50 mm

- One of three Australian species of frogs to become naturalised in NZ
- Found throughout most of NZ, including Otago
- They produce a high-pitched cricket-like trilled call repeated 5 or 6 times, described as “weeeeeeep-eeep-eeep-eeep-eeep-eeep”
- Breeds during cold wet spells (sometimes during snow-fall) in spring, autumn or winter, and is the only southern-hemisphere frog known to be freezing tolerant
- Not usually seen during daytime

**Where to see:** these frogs are commonly heard calling from ornamental ponds in suburban gardens in the city. They can also be found in ponds at Ross Creek and the Botanical Gardens in North Dunedin.

*Not present in Otago but significant to New Zealand; fossil records indicate that native frogs (including some extinct species) were once present in South Island, New Zealand*

## **Archey's frogs, Hamilton's frogs, Hochstetter's frogs**

*Leiopelma archeyi, L. hamiltoni, L. hochstetteri*

F. Leiopelmatidae



Archeys Frog - Phil Bishop

**Status:** Native frogs (*L. archeyi* Critically Endangered, *L. hamiltoni* Vulnerable, *L. hochstetteri* Vulnerable)

**Recognition:** Small brown frogs with no typanum. The dorsal colouration of Archey's frogs can vary from brick red, to green and even blue. The other species are mainly brown with black markings, although occasionally green patches or green morphs may be found. The fingers and toes do not have suckers and only *L. hochstetteri* has a small amount of webbing on the feet.

**SVL:** males up to about 35 mm, females up to 50 mm

- There are no native frogs on the South Island
- Extant species found in Whareorino Forest, Coromandel State Forest and the Waitakere Ranges near Auckland and on islands in the Marlborough Sounds
- They do not produce loud mating calls and are usually silent
- Archey's and Hamilton's frogs are terrestrial breeders with male parental care
- These frogs prefer cool misty evenings and are particularly active above ground when the temperature is between 8 and 14°C
- While there is no fossil evidence to suggest that native frogs ever occurred in the greater Dunedin area, fossil leiopelmatid bones have been found from the Miocene in St Bathans, Otago. More recent fossil bones (c. 300 years old) have been found near Te Anau, which is 290 km NW of Dunedin.

**Where to see:** Zealandia Ecosanctuary in Wellington conducts night tours to see native frogs introduced into the sanctuary. These frogs are very difficult to find in the wild and are protected under the Wildlife Act 1953 – it is illegal to disturb or capture these frogs.

## Key sources and further reading

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