

Alpine lizard research in Fiordland National Park

February-March 2007

Trent P. Bell, Geoffrey Patterson and Tony Jewell

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February–March 2007

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ABSTRACT

In 2004, a new species of skink ('Sinbad skink'; *Oligosoma* sp. 'Sinbad Valley') was discovered in Fiordland National Park, South Island, New Zealand. Although the individual was collected as a potential holotype specimen, it was a juvenile; therefore, a taxonomic description of this species remained incomplete. Field expeditions were undertaken to the Darran Mountains and Llawrenny Peaks, Fiordland National Park, to collect data on and photographs of an adult Sinbad skink for the preparation of a formal taxonomic description of the species. The Barrier Knob and Sinbad Gully areas were surveyed and 11 lizards, including one Sinbad skink, were captured over 5 days. One possible new species of skink, which has been assigned the tag name 'Barrier skink', was discovered. Another skink (tentatively called the 'mahogany skink') may represent a second new species, but requires further investigation. The presence of introduced mammals and weka (*Gallirallus australis*) within the Sinbad area are of concern for both the Sinbad and mahogany (*Oligosoma* sp. 'mahogany skink') skinks, since these skinks are likely to have high priority for research and conservation. Further surveys are required to identify and secure populations of each taxon, and to establish their range, habitat and microhabitat, and conservation status. Our findings suggest that Fiordland is a potential 'hotspot' for lizard diversity. Additional surveys for both geckos and skinks in the Fiordland National Park are required, as further new species are likely to exist throughout the area.

Keywords: *Oligosoma* spp., *Hoplodactylus* spp., Sinbad skink, Barrier skink, mahogany skink, Cascades gecko, taxonomy, Fiordland National Park

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1. Introduction

In 2006, we undertook a contract to capture, collect data and photograph a live adult Sinbad skink (*Oligosoma* sp. 'Sinbad Valley') in the field. This would allow the completion of a formal taxonomic description of this new skink species, since the only known animal, the potential holotype¹, was a juvenile and did not provide a complete representation of the species. Field work to acquire the necessary information and photographs was undertaken in February and March 2007.

2. Background

For many years, Fiordland National Park in the South Island of New Zealand was generally considered an area depauperate in lizard representatives, due to the cold and wet environment prevalent in this area and the difficult terrain. Lizards were not known in the area until c. 1966. Since then, it has been found that several species of skinks and geckos inhabit the area. Common, green and cryptic skinks (*Oligosoma nigriplantare polychroma*, *O. chloronoton* and *O. inconspicuum*, respectively), jewelled geckos (*Naultinus gemmeus*) and the 'Otago large' gecko (*Hoplodactylus* aff. *maculatus*) are now known from lower altitudes, particularly in the Eglinton Valley and Te Anau Downs area (Department of Conservation (DOC) BioWeb HERPETOFAUNA database², accessed January 2007). Fiordland skinks (*O. acrinasum*) are known from coastal southwestern Fiordland, on islands and rocky inlets, with only one known mainland population (Hardy 1977). The 'Te Kakahu' skink, first discovered c. 1999, is an as-yet undescribed species of skink known only from Chalky Island in southwestern Fiordland (Loh 2003). The known range of the Takitimu gecko (*H. cryptozoicus*) was recently extended to include the Waitutu area (R. Cole, DOC Southland Conservancy, pers. comm. 2006), and the 'southern mini' gecko (*H. aff. maculatus*) has now been recorded in the Livingstone Mountains (DOC BioWeb HERPETOFAUNA database 2007).

Before 2004, there had been several sightings of lizards in alpine habitats in Fiordland National Park, but without positive identifications. In 2004 and 2005, DOC undertook alpine gecko surveys in many parts of Fiordland. The Cascades gecko (a member of the forest gecko, *Hoplodactylus granulatus*, species complex) was discovered during these surveys and is now known from several sites, including the Esperance Valley (R. Morris, wildlife photographer, pers. obs. 1974), Mount Underwood (B. Judge, rock climber, pers. comm. 2005), Homer Tunnel area (A. Goodman, DOC Southland Conservancy, pers. comm. 2006) and Barrier Knob (Bell & Patterson 2006).

¹ See Glossary for definition of this and other technical terms included in this report.

² Administrated by B. Kappers, Hawke's Bay Area Office, DOC.

In March 2004, during the DOC surveys, a juvenile skink was discovered at 1100 m above sea level (a.s.l.) at the head of Sinbad Gully, Llawrenny Peaks, by one of the authors (T. Jewell). This skink was assessed by the authors as a new species with strong phenotypic and morphometric affiliations with the Fiordland skink. This skink was given the tag name of the 'Sinbad Valley' skink, hereafter denoted as 'Sinbad skink', and is now in the lizard collection at the Museum of New Zealand Te Papa Tongarewa (Te Papa; specimen number R 5315).

In late 2004, Te Papa sent a selection of Fiordland skinks (*Oligosoma acrinasum*) to T. Bell and T. Jewell to compare with the Sinbad skink. This included one skink (S.484) from the Milford area that had no initial locality or date recorded, collected by T. Choate. In a separate letter from T. Choate to M. Scofield, Chief Ranger, Fiordland National Park, dated 7 November 1966, Choate indicated that the animal was collected from '4000 feet on Students Peak' in the Darran Mountains (DOC Southland Conservancy file FNP28 folio 269). This skink strongly resembles a Sinbad skink.

In 2005, two skinks were captured and photographed at 1600 m.a.s.l. on the North Face rock-climbing area of Barrier Knob in the Darran Mountains (M. Judge and B. Judge, pers. comm. 2005). Although the photographs were out of focus, the specimens they depicted also resembled the skinks from Sinbad Gully. At the time, it was thought they were identical (e.g. see Bell & Patterson 2006). However, our expedition was later to find that these animals were clearly distinct (see section 4.4.1).

3. Methods

3.1 STUDY SITES

Two study sites were selected for this survey work, based on previous sightings (see section 2) and the limited budget available: the Barrier Knob area (Darran Mountains) and Sinbad Gully (Llawrenny Peaks), both of which are in Fiordland National Park (Fig. 1).

3.1.1 Barrier Knob

Barrier Knob is a mountain peak reaching up to 1800 m.a.s.l. in the Darran Mountains (Darran Ecological District 72.01; McEwan 1987), which forms a ridge between the Adelaide and Gertrude Valleys. The study site is alpine in nature, mainly consisting of bare rock cliffs rising above snow slopes, with some alpine vegetation established in rock crevices, especially in areas protected from snow-shear. The flora of this zone consists mainly of the mountain daisy (*Celmisia hectorii*, tikumu), mountain lily (*Astelia* spp.), mountain buttercup (*Ranunculus lyallii*) and snow marguerite (*Dolichoglottis* spp.). The survey area was the North Face climbing area (Figs 1 & 2), which is between 1400 and 1700 m.a.s.l. (Jefferies 2006). Lizards were captured at the base of the North Face cliffs by M. Judge and B. Judge in 2005. This same area was unsuccessfully surveyed for skinks in February 2006 (Bell & Patterson 2006).

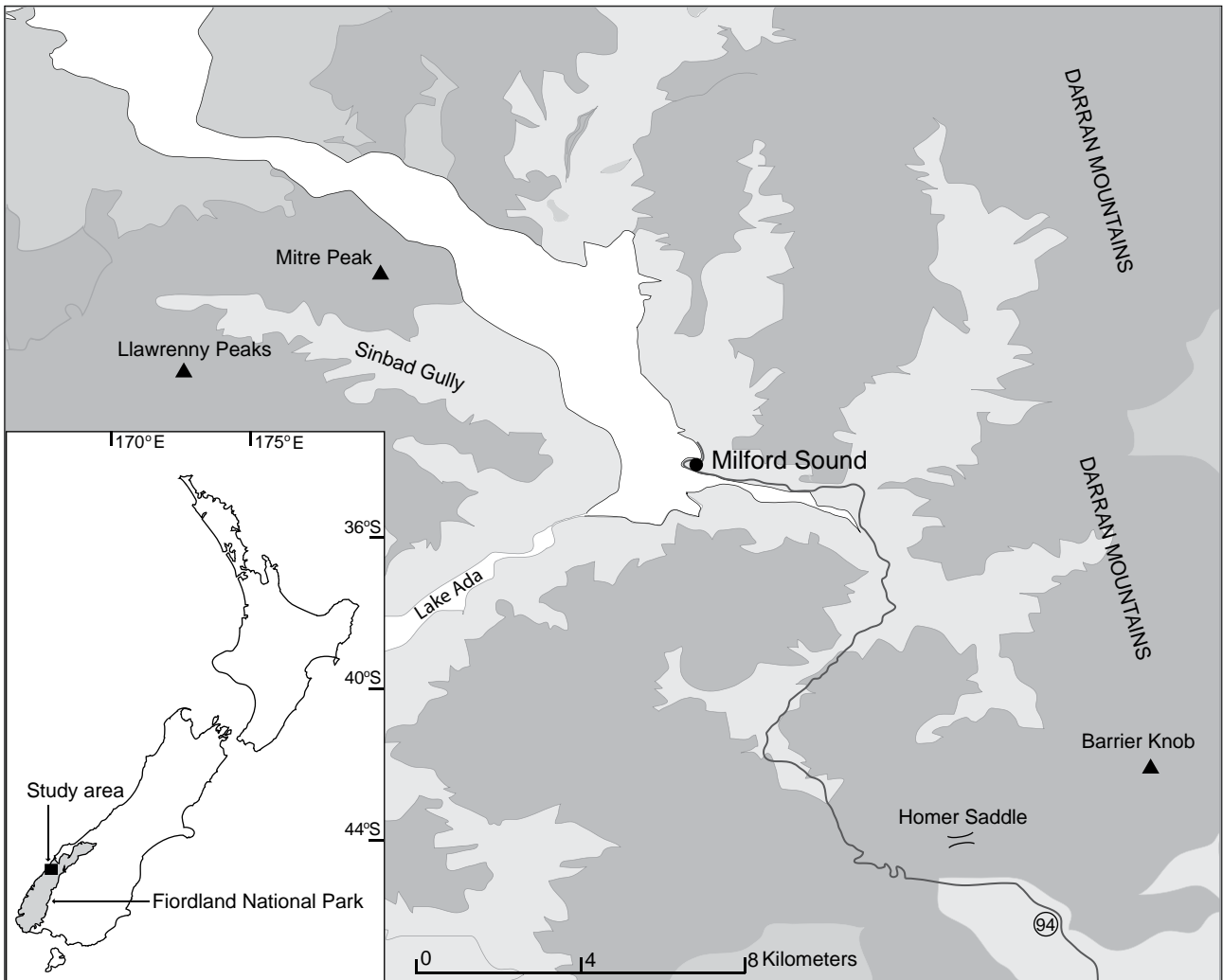


Figure 1. Map showing the locality of Fiordland National Park, South Island, New Zealand, and the main study areas at Barrier Knob, Darran Mountains, and Sinbad Gully, Llawrenny Peaks.

Figure 2. Barrier Knob, Darran Mountains. The Barrier skinks were found at the base of the bluff at 1600 m a.s.l., above the snow-packed slopes.
Photo: Trent Bell.



3.1.2 Sinbad Gully

Sinbad Gully is a north/northwest-facing alpine cirque basin at the head of Sinbad Valley at 1100 m a.s.l. It is enclosed on three sides by vertical rock cliffs 150–250 m high. These are part of the Llawrenny Peaks (Darran Ecological District 72.01; McEwen 1987), which reach up to 1925 m a.s.l. The study site is alpine to sub-alpine, with the sheer cliffs that form the cirque basin largely supporting subalpine grasses and ferns in crevices and damp areas, and being entirely devoid of vegetation in other areas (such as the ‘Shadowland’ rock-climbing area; Jefferies 2006). The flora of Sinbad Gully consists of plants adapted for alpine and subalpine areas. These include the mountain daisy, mountain lily, mountain buttercup, snow marguerite, snow totara (*Podocarpus nivalis*), *Dracophyllum* spp., and whipcord hebes (*Hebe* spp.). There are also various species of fruit-bearing sub-shrubs, particularly *Coprosma* spp., *Gaultheria* spp. and pohuehue (*Muehlenbeckia axillaris*). The basin floor consists of more diverse subalpine tussock grassland and shrubland. The survey area was along accessible cliff areas at the head of the Sinbad Gully at 1100–1200 m a.s.l. (Figs 1 & 3). This is the site where the first Sinbad skink was discovered by T. Jewell in March 2004.



Figure 3. Sinbad Gully, Llawrenny Peaks. The Sinbad and mahogany skinks (*Oligosoma* spp.) were found 10 m apart on tussock ledges of this cliff at 1100 m a.s.l. Photo: Trent Bell.

3.2 FIELD TRIPS

A Low Impact, Collecting and Research Permit (SO-20349 FAU) and One-off Aircraft Landing Permit were secured through the Te Anau Area Office, DOC (A. Smart, K. Osborn).

3.2.1 Barrier Knob

The North Face climbing area of Barrier Knob was surveyed on 26–28 February 2007. The field team for this trip included T. Bell (field leader), M. and B. Judge (experienced rock climbers), T. Jewell (herpetologist), R. Morris (wildlife photographer), J. MacTavish and J. Kelbling (Otago University Natural History Film students), and R. Müller (herpetologist).

After flying in by helicopter from Milford Sound, access to the North Face was gained by traversing the lower slopes of Barrier Knob from the campsite on Adelaide Saddle, and pitching across ice sheets using ice axes, climbing ropes and belay devices. M. Judge and B. Judge led the traverse to the site where the first skinks were captured by them in 2005. This area is a small (50 m × 50 m) but safely accessible section of the 200-m-high faces of Barrier Knob.

T. Jewell, T. Bell and R. Müller surveyed the Barrier Knob area for lizards during sunny days and at times when direct sunlight fell on the face (early morning to mid-afternoon). This gave about 5 available hours of surveying per day. This limited window of opportunity was further complicated by the initial arrival of the team by helicopter and set-up of camp on the first day, and the lengthy daily traverses from the camp site.

3.2.2 Sinbad Gully

Sinbad Gully was surveyed on 9–11 March 2007. The team for this trip consisted of the same core team that visited Barrier Knob (see section 3.2.1), with the exception that C. Hudson replaced R. Müller and J. Kelbling was absent.

Sinbad Gully was also accessed by helicopter from Milford Sound. T. Jewell, T. Bell and C. Hudson surveyed the Sinbad Gully area for lizards under similar conditions as for Barrier Knob (i.e. during sunny days and at times when direct sunlight fell on the face in the mid-morning to mid-afternoon). This gave about 7 available hours of surveying per day. M. Judge and B. Judge provided secure climbing ropes using cam and nut devices to safely access difficult sections.

3.3 FIELD METHODOLOGY

The surveys were timed to coincide with a clear, settled period of weather, using the online weather forecast charts available from MetVUW (www.metvuw.com). The surveys were conducted by observing the rock area for active and basking lizards using visual scanning with and without binoculars, climbing on and around accessible sections of the cliffs to search for disturbed animals, and finally looking into crevices for inactive lizards. Alpine vegetation was also searched and rocks turned over.

All lizards were captured where possible, identified and photographed. Macro photography was conducted using a Canon EOS 400D with extension tubes and a macro ring flash. Measurements (to the nearest 1 mm) were made of snout-vent length (SVL), tail length (TL) and length of the regenerating portion of the tail (where applicable) (r). The following detailed morphometric measurements were also taken (to the nearest 1 mm) for the taxonomic descriptions: snout-forelimb; axilla-groin; snout-eye; eye-ear; diameter of eye and ear; ear-forelimb; and hind-limb length. Mid-body and lamellae scales were also counted. Individuals were weighed to the nearest 0.25 g using a 30-g Pesola™ spring balance and sexed. No temporary or permanent identification marks (such as toe-clipping) were applied to lizards, but genetic samples were taken from tail tips of skinks. Global positioning system (GPS) references and photographs were taken at the site of capture.

D. Chapple (Victoria University of Wellington, New Zealand; now at Museum Victoria, Australia) conducted genetic analyses of nucleic and mitochondrial DNA from tail tip samples of skinks, as part of his national skink phylogeny postdoctoral research at Victoria University of Wellington, New Zealand. Chapple's methodology is described in Chapple & Patterson (2007).

4. Results

During the survey period, the weather at Barrier Knob was fine and sunny, with air temperatures ranging from 20.8°C to 28.8°C for 2 days. During the mid-point of the day on Barrier Knob, the rock reached temperatures of up to 45.3°C, resulting in lizards becoming inactive and thus affecting survey results. At Sinbad Gully, the weather was generally fine, with lower temperatures (12°C to 20°C). Low cloud and cold temperatures on the last day at Barrier Knob, and an incoming front that delivered torrential rainfall on the last day of the Sinbad survey rendered any further surveying ineffective.

A total of 11 lizards were captured during both surveys over 5 days. Four skinks and two geckos were captured from Barrier Knob, and two skinks and three geckos from Sinbad Gully.

4.1 BARRIER KNOB

4.1.1 Skinks

The four skinks (one male, two females and one juvenile) from Barrier Knob were morphologically distinct from the Sinbad skinks, and are likely to be a new species. The tag name 'Barrier skink' was given to these skinks. These 'Barrier skinks' were medium to large in size (reaching up to 81 mm SVL, 179 mm TL, and weighing up to 12.1 g). They were mainly black dorsally and laterally, with yellowish, green, cream or brown flecks, and white ventrally, with occasional black speckles (Fig. 4). They bore a striking resemblance to the grand skink (*O. grande*) of Otago.

Initial genetic analyses (D. Chapple, Museum Victoria, Australia, pers. comm. 2007) placed these skinks in the Fiordland skink (*O. acrinasum*) group, of which the Sinbad skink is also a member. Other members of this group are *O. infrapunctatum*, *O. ottagense*, *O. taumakae* and *O. waimatense* (D. Chapple, pers. comm. 2007).

The Barrier skink is a rock-dwelling, diurnal, heliothermic species, with avid sunbasking behaviour. The four skinks were found occupying mainly clean rock bluffs at 1600 m a.s.l. The skinks retreated into large crevices in cliffs or hid in snow tussock (*Chionochloa pallens*) when alarmed.