



TRANSLOCATION OF MOKO SKINK (*Oligosoma moco*) FROM LADY ALICE, WHATUPOKE AND COPPERMINE ISLANDS TO MATAKOHE-LIMESTONE ISLAND (NOVEMBER/DECEMBER 2009)

Report prepared by Cathy and Peter Mitchell
for the Friends of Matakoho-Limestone Island, January 2010.

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ABSTRACT

Forty-nine moko skinks (*Oligosoma moco*) were captured on Lady Alice, Whatupuke and Coppermine Islands of the Marotere Group in November and December 2009 for translocation to Matakoho-Limestone Island as part of the island restoration project.

Moko skink collection was attempted from Whatupuke Island in November 2008 and February 2009 using pitfall traps. Insufficient numbers of skinks were collected so the translocation did not proceed and captured skinks were released at their capture locations. The capture protocol was modified so that G-minnow traps were used for capture. In addition, capture locations were extended to include different habitats and covering the three main islands of the Marotere Group. The skinks were captured in G-minnow traps on beaches and open sunny ridges on the three islands and were selected for a female-biased population of 1 male: 2 females.

The skinks were held in quarantine at Massey University, Albany Campus, while disease screening was carried out. The sex, snout-vent lengths (SVL) and weights for each animal were recorded. Faecal swabs were taken for *Salmonella* culture, and faecal samples were collected for *Cryptosporidia* testing. During transport and quarantine the skinks were held in individual containers and fed meal-worms raised at Massey University.

All 49 moko skinks were negative for *Salmonella* and *Cryptosporidia*.

On December 24th 2009, the moko skinks were released to the previously identified location on the northern shoreline of Matakoho-Limestone Island. In total, 49 ornate skinks, 15 males and 34 females, were translocated to Matakoho-Limestone Island.

INTRODUCTION / BACKGROUND

The moko skink (*Oligosoma moco*) is a native skink of the *Oligosoma* genus. This species is diurnal and is an avid sun-basker. It is generally found on or near the coast. It inhabits open forest, scrub and grass-land typically in or near dense vegetation. As with most native New Zealand skinks, except for *O. suteri*, moko skinks give birth to live young. The skink occurs in the North Island, north of the Bay of Plenty. It is found in a few mainland sites on the east coast and is widespread on north-eastern offshore islands.

Matakoho-Limestone Island is a 40 ha (approx.) island located in the upper Whangarei Harbour. The island is a designated Scenic Reserve managed by a voluntary community incorporated society, Friends of Matakoho-Limestone Island (FOMLI), formed in 1991. A full-time ranger is resident on the island. A large scale restoration programme is underway with species introductions carried out (both assisted and unassisted) as habitat and food source increase. The island is predator-free, with the possible exception of a

very small number of mice (less than 1% tracking over the last three years). It is highly likely that many species of lizard, including moko skinks, originally inhabited Matakohe-Limestone Island. There is a resident population of the native copper skink (*Cyclodina aenea*) still present on the island.

In a survey carried out on Whatupuke Island moko skinks were captured in pitfall traps at two of the areas surveyed, that is beach and flax/scrub habitat (Whitaker and Parrish, 1999). A capture rate of 24 moko skinks / 100 trap-days (TD) was achieved in coastal pitfall traps during this survey. Moko skinks were also captured in pitfall traps on Lady Alice and Coppermine Islands of the Marotere Group (Towns and Parrish, 1997). Thus moko skinks have been recorded on the three main islands of the Marotere Group.

The purpose of the translocation is to establish a new population of moko skinks on Matakohe-Limestone Island, as identified in the Matakohe-Limestone Restoration Plan (J Ritchie, 2000). This is primarily a species restoration exercise, but will additionally provide valuable advocacy opportunities. The moko skink is the fifth of up to eight species of lizard planned for translocation to Matakohe-Limestone Island over a three – five year period. (Shore skink were translocated in 2007, ornate skink were translocated in 2008, and Pacific and common geckos were translocated in 2009 – see earlier reports).

METHODS / RESULTS

Preliminary Disease Screen of Resident Skinks.

A preliminary disease screen of the copper skinks resident on Matakohe-Limestone Island was carried out in October 2007, prior to the shore skink translocation. Thirty skinks were screened for *Salmonella* and *Cryptosporidia* – all samples were negative (Mitchell C & P, 2008).

Collection Trips, Whatupuke Island November 2008 and February 2009

A trip to the Marotere Island group was undertaken from November 3rd – 7th 2008. A team of five people set up camp at Lady Alice Island and travelled daily to Whatupuke Island using a 12ft aluminium dinghy. The purpose of the trip was two-fold. It was planned to capture both ornate and moko skinks for translocation to Matakohe-Limestone Island. The established monitoring pitfall traps at Koarea Bay (K Bay) and Boulder Bay (B Bay) were set for moko skinks. Pitfall traps were established and set in the forested areas for ornate skinks. An additional line of ten pitfall traps was set at K Bay. Pitfall traps consisted of four-litre plastic buckets set into the ground, baited with cat food and covered with a plywood lid.

Hand capture of ornate skinks was very successful, with 30 skinks captured for translocation over four days (Mitchell C & P, 2009). The pitfall traps for moko skinks were set at B Bay and K Bay over four nights. Six moko skinks were captured in pitfall traps and one was captured by hand. It was felt that the numbers caught were insufficient for the translocation to proceed and the captured skinks were released at their capture locations. The moko pitfall traps were closed and the ornate traps were removed.

Temperatures on the November 2008 trip were relatively cool and the days were overcast. It was felt that these environmental conditions could explain the low capture rates of moko skinks (compared to the capture rate of 24 moko / 100TD achieved in 1999). A second collection trip was attempted in February 2009 when the weather was warmer. This trip also had the purpose of assisting with the ongoing DoC response to the rat incursion on Whatupuke Island.

A team of four people set up camp on Whatupuke Island and travelled on foot to the beaches each day. The permanent pitfall traps at K Bay and B Bay and the additional line at K Bay were set and baited with cat food. Once again capture rates were low with only two moko skinks captured over three days, despite hot sunny weather. The two captured skinks were released at their capture locations. The permanent monitoring pitfall traps were closed and the ten temporary pitfall traps were removed. Summaries of pitfall capture data on the November and February trips are given in Appendix 2.

Modification to collection methods - November 2009 trip

With inadequate numbers of moko skinks collected on both the trips detailed above, a new collection strategy needed to be developed. Moko skinks had been seen on Whatupuke Island on the beaches and also on some of the more open ridges amongst flaxes and scrub. It was decided to widen the habitat searched to include these open dry ridges. With moko skinks having been reported (and seen by team members) on Lady Alice and Coppermine Islands, permits were obtained from DoC to extend the searches to these islands in addition to Whatupuke Island. The traps were to be set at least 50 metres, preferably 100 metres, away from the permanent lizard monitoring lines set up on these islands.

The beach pitfall traps had proven to be very successful at catching lizards, with a good variety of lizards caught in them and good numbers of some of those species caught. It was uncertain whether moko skinks were less susceptible to pitfall trapping or whether competition from the larger species present was excluding them from the beach locations where the pitfall traps had been set. It was suggested that G-minnow traps could be a good alternative trapping method, as this had proven to be successful elsewhere (M. Baling and B Barr *pers com*).

A trip to Lady Alice Island was undertaken in November 2009 with the primary purpose of collecting Pacific and common geckos for translocation (Mitchell C & P, 2010). The opportunity was taken on this trip to set minnow (funnel) traps on Lady Alice Island to trial their use. One line of minnow traps was set on South Cove beach and one line on Koputotara Bay (KT Bay), using a combination of metal and collapsible plastic netting minnow traps.

In one trap night seven moko skinks were caught in KT Bay and one was caught in South Cove. Capture data is summarised in Appendix 2. At KT Bay four moko skinks were captured in metal traps and three were captured in mesh traps (the trap type was not recorded at South Cove). A number of the mesh traps were found to have holes in them when they were pulled in. These holes were not present when the traps were put out, but will have reduced the trapping efficiency of the traps.

The eight moko skinks caught were retained for translocation and were transported to Massey University with the geckos captured on the same trip. It was felt, with such a good capture rate and the increased number of capture locations available, that sufficient animals would be obtained on the trip planned for early December for the translocation to proceed. The eight moko skinks remained at Massey University until the skinks from both collection trips were cleared on their disease screen. All the skinks were then translocated together at the end of December 2009 (see below).

Collection trip December 2009

On December 7th 2009 a team of three people travelled by boat to Lady Alice Island and a base was set up at the hut. A smaller boat and outboard were transported to Lady Alice Island so that the team could also travel to Whatupuke and Coppermine Islands. Metal G-minnow traps only were used on this trip.

On the first afternoon G-minnow traps were set on Lady Alice Island in three locations. Traps were set at KT Bay (14 traps), South Cove (eight traps) and the ridge of bait-line B above the hut and West Bay (12 traps). The traps were baited with cat food, refuges of vegetation were placed in the traps and the traps were located so that vegetation could be draped over to provide shade. On the ridge the relatively open areas of flax and low scrub, rather than more mature bush, were chosen to set the traps.

On the second day, December 8th, G-minnow traps were set on Whatupuke Island, on the ridge above Boulder Bay (ten traps) and at K Bay (14 traps). In addition, the 18 pitfall traps already present at K Bay were opened and set. Two lines of traps were also set on Coppermine Island, one at the lighthouse (seven traps) and one on the narrow saddle of the ridge track heading to the west of the island (seven traps). See Appendix 1 for the locations where the trap lines were placed. Once again, apart from K Bay, the traps were set in open sunny areas of low vegetation on the island ridges.

The traps on B Line were checked late on the afternoon of December 8th. Fourteen moko skinks had been captured, seven of which were retained for translocation. One trap, which contained a dead moko skink, was moved to a new location (see below).

On December 9th the traps at KT Bay were checked, nine skinks were held for translocation, and the traps were pulled in. The South Cove traps were checked the same day, one skink was kept, and the traps were pulled in. B Line was checked again and seven more skinks were collected. B Line was left set in place in case the traps on the other islands were less productive, as it was close to camp and therefore easily serviced. Some of the empty traps, higher up the ridge, were moved to new locations lower down.

On December 10th the traps on Whatupuke and Coppermine Islands were checked and pulled in. The permanent monitoring pitfall traps on K Bay were closed. B Line was checked and the G-minnow traps brought in. The final skinks for translocation were collected that day – nine from Whatupuke, nine from Coppermine Island and one more from B Line on Lady Alice Island. See Appendix 3 for capture data including other species caught. The skinks were selected for a sex-biased a sex ratio of 1 male: 2 female. Given the good capture rates, larger skinks and obviously gravid females were selected for translocation, with smaller adults and any skinks lacking tails being released.

The moko skinks were kept in individual containers while on Lady Alice Island and were placed in transport tubes to travel off the island on the morning of December 10th. One male moko skink (M12) was found to have escaped from its container on the morning of departure. This skink had originally been captured on B Line, Lady Alice Island so escaped within 200-300 metres of its capture location. There was insufficient time to capture a replacement animal.

The 41 moko skinks for translocation were transported to Marsden Cove, Ruakaka by helicopter (as a back load from another group arriving at Lady Alice the same morning). The skinks were then transported by car to the Ecology and Conservation Group, Massey University, Albany, Auckland.

Dead Skinks

Four deceased skinks were found in the G-minnow traps. Three of these skinks were moko skinks and one was a juvenile *Cyclodina macgregori*. Details are as follows,

- One adult moko skink was captured in a trap on B Line. It was the only animal in the trap. The trap was in a shady location and was checked 24 hours after it was set. Ants had eaten out the body of the skink.
- One moko skink was captured in a trap on Boulder Bay ridge. The trap was checked 48 hours after it was set. This trap also contained two live adult moko skinks.
- One juvenile moko skink was captured in a G-minnow trap on K Bay. It was lacking a tail (it was not recorded whether this was a fresh tail loss). The trap was checked 48 hours after it was set. One live adult moko skink was in the same trap.
- One juvenile *Cyclodina macgregori* was captured in a G-minnow trap on K Bay. The juvenile had suffered a recent tail loss and had a bite mark across its neck. The trap was checked 48 hours after it was set. The trap also contained a live adult *C. macgregori*.

Quarantine at Massey University

Disease testing was undertaken on the moko skinks to ensure they did not carry any pathogens which could present a threat to the fauna already present on Matakohe-Limestone Island. During this period they were held at the quarantine facility at the Ecology and Conservation Group, Massey University, Albany. The skinks were held in individual containers, checked everyday for any obvious symptoms of potential sickness, provided with fresh water and periodically fed meal-worms grown at the facility. The eight skinks captured in November were held at this facility for a period of approximately five weeks, the remaining 41 skinks were held for almost two weeks until the final disease testing results for all the skinks became available.

All skinks were weighed and snout-vent lengths (SVL) and vent-tail lengths (VTL) were measured (see Appendix 4). Faecal samples were collected for disease screening by placing skinks in individual cleaned and disinfected ice cream containers. Trigene spray was used to disinfect the containers, which were then allowed to air dry before use. Paper towels were used as 'clean' refuges while the skinks were in the containers and water was provided.

Once faeces were obtained the skinks were placed back into their individual containers and the faecal samples were swabbed with paediatric transport media swabs for *Salmonella* testing. (Note: It was a permit requirement that faecal swabs, rather than cloacal swabs, were used for this test). The rest of the faecal sample was then collected for *Cryptosporidia* testing. These samples were all sent to New Zealand Veterinary Pathology (NZ Vet Path), Hamilton for testing.

Moko skink disease test results

All of the 49 moko skinks disease screened for *Salmonella* and *Cryptosporidia* were negative.

Moko skink release

On the morning of December 24th 2009, 49 moko skinks travelled by car in individual containers to Onerahi. The skinks were then transferred to the island barge and transported to the all-tide berth at Matakohe-Limestone Island.

On arrival at Matakohe-Limestone Island, the skinks were welcomed and blessed. Te Warahi Heteraka of *Ngatiwai* and Freddie Tito of *Te Parawhau* led the welcome and handing over of the skinks. Those present included many members of the FOMLI Committee and members of the general public, approximately 20 people in total.

The skinks were released at the previously identified site on the track leading to the northern quarry. This site is north-facing, sunny and rocky, providing plenty of opportunity for sun-basking. There is ample low vegetation and flaxes on either side of the track providing good cover.

In total 49 moko skinks were released onto Matakohe-Limestone Island in the approximate sex ratio of 1 male: 2 female. Actual numbers were 15 males and 34 females.

DISCUSSION

Moko skink capture

The December 2009 collection trip proved to be very successful with a total of 113 moko skinks caught in 194 trap days (TD), giving a capture rate of 58 moko skinks/100TD. The highest capture rate was achieved in the G-minnow traps set on Coppermine Ridge, which had a capture rate of 107 moko skinks/100TD. The lowest capture rate was achieved in the Koarea Bay pitfall traps, with a capture rate of six moko skinks/100TD. The lowest G-minnow trap capture rate was achieved at South Cove with a capture rate of 25 moko skinks/100TD.

Of the 113 moko skinks captured, 30 were juveniles, leaving 83 adults from which 42 skinks were to be selected (eight were already being held at Massey University). This allowed tighter selection criteria to be applied to the animals chosen for translocation. Larger adults and obviously gravid females were retained for translocation.

Comparison of trapping methods

Paired trials would be needed to determine which trapping method (pitfall or G-minnow trap) is the more effective means of capturing moko skinks. However the trapping data from K Bay, where both methods were used, does give some comparative data.

The permanent pitfall traps at K Bay were used each time trapping was carried out there, and were located at the more northern end of the beach, five to ten metres back in the littoral zone. The ten temporary pitfall traps were set at the southern end of the bay on the November 2008 and February 2009 trips. The G-minnow traps set in December 2009, were placed at the southern end of the bay where the temporary pitfalls had been set (six traps), on the shoreline adjoining the permanent pitfalls (four traps) and in the northernmost corner past the permanent pitfalls (four traps).

The pitfall traps in K Bay achieved a total capture rate of three moko skinks/100TD over the three trips for which they were set. On the December 2009 trip, in K Bay, the pitfall traps achieved a capture rate of six moko skinks/100TD and the minnow traps achieved a capture rate of 57 moko skinks/100TD. This is a significant difference. From this data it would appear that G-minnow traps are a more effective method of capturing moko skinks than pitfall traps.

Two varieties of minnow traps were used in November 2009. At Koputotara Bay in November 2009, eight plastic mesh and eight metal mesh minnow traps were set. Three moko skinks were caught in the plastic minnow traps and four were caught in the metal minnow traps. The numbers caught were not high, but there appears to be no difference in the catch rate of the two trap types. It should be noted that holes were somehow created in the plastic mesh traps overnight – possibly created by crabs or large lizards (*C. macgregori* are present on this beach). Note, however, that three *H. duvauceli* were caught and held in the plastic traps without escaping. It is possible that moko skinks may have escaped from the damaged traps reducing their apparent catch rate. The metal G-minnow traps would therefore appear to be a better choice when attempting lizard capture due to the reduced risk of trap damage, although they are heavier and more bulky to carry into trapping locations.

Comparison of trapping locations

Two habitat types were trapped for moko skinks - rocky beaches and open ridges. Both habitat types offered sun-basking areas and good ground cover, such as flaxes, as refuges. Over three trips the beach traps (pitfalls and G-minnows) achieved a capture rate of eight moko skinks/100TD. Over two trips the ridge traps achieved a capture rate of 88 moko skinks/100TD. This is a significant difference in capture rates.

The beach traps caught a wider variety of species, and in many cases high total lizard numbers. For example, the traps at B Bay caught 92 lizards of five different species (including one moko skink) in 81 trap days. It may be that higher levels of competition, with larger species, is suppressing the numbers of moko skinks on these beaches. On the December 2009 trip, it was observed that the moko skinks captured at K Bay had a higher rate of tail loss than those captured elsewhere, though the actual numbers were not recorded. This observation would support the idea that interspecific competition is playing a role in determining moko numbers on these beaches.

Dead skinks

Four dead lizards were found in the G-minnow traps in December 2009. One was an adult moko skink in a trap set in a shaded position on B Line. It was the only lizard in the trap, the trap was checked approximately 24 hours after it was set and the body of the lizard had been hollowed out by ants, which were still swarming over it when found. It is possible that the trap had been placed at/near an ant nest and the ants had caused the death of the skink, though this cannot be confirmed. Another possibility for the cause of death for this skink and the others detailed below is dehydration in the hot weather. It seems a less likely cause in this particular case as this trap was placed in one of the shadiest locations and the skink had sole use of the refuge placed in the trap.

Two other moko skinks were found dead in traps. One was a juvenile and both dead skinks were present in traps with other moko skinks. Both traps had been set for approximately 48 hours when cleared. It is possible that intraspecific aggression was the cause of death for these two skinks.

One juvenile *C. macgregori* was found dead in a G-minnow trap which also contained a gravid adult female *C. macgregori*. The juvenile had suffered a very recent tail loss and a bite mark could be seen across its neck – see photos below. The size of the bite corresponded to the jaw size of the adult female, and there is little doubt that aggressive behaviour of the female caused the death of the juvenile.



It should be kept in mind when using minnow traps that aggression between and within species can potentially cause the death of trapped animals. To minimise this risk, traps would ideally be checked every 24 hours and plentiful refuges in the form of vegetation should be placed in the traps. Good refuges, plenty of cover over the traps and frequent checking would also help reduce the risk of death due to dehydration.

Aggression between animals is likely to vary with the species concerned. Two pitfall traps at K Bay held five *O.suteri* each, with no apparent injury to any animal. It was also noted that *C. macgregori* were quite aggressive and readily biting and not releasing those handling them.

Monitoring

Post-translocation monitoring of the moko skinks will be undertaken as detailed in the Translocation Proposal. Monitoring will be undertaken one, two, three, five, ten and 15 years following release, to determine survival of translocated individuals, evidence of breeding and eventually establishment of a self-sustaining population (more new than transferred individuals). Monitoring will be carried out using G-minnow traps.

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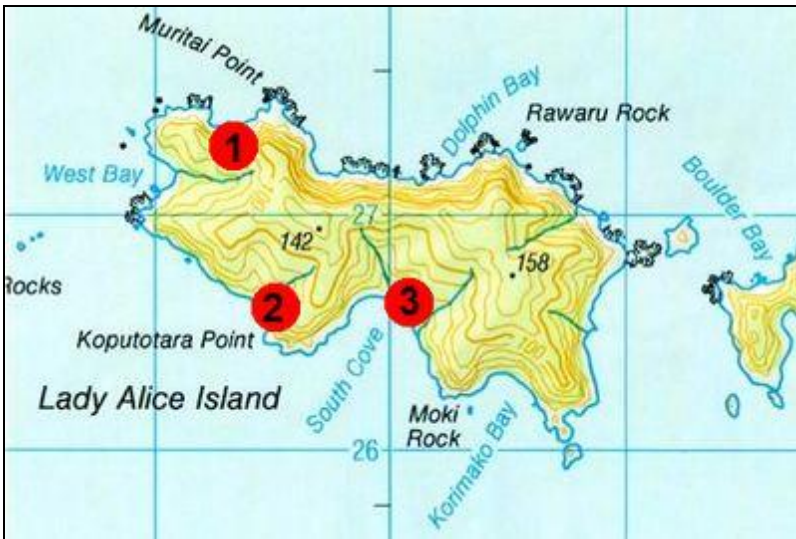
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APPENDICES

- Appendix 1: Maps showing the location of pitfall and minnow trap lines set on Lady Alice, Whatupuke and Coppermine Islands, November 2008 to December 2009
- Appendix 2: Capture data for traps set on Whatupuke Island in November 2008 and February 2009, and set on Lady Alice Island in November 2009.
- Appendix 3: Capture data for traps set on Lady Alice, Whatupuke and Coppermine Islands in December 2009.
- Appendix 4: Moko skink data recorded at Massey University (Albany Campus) during quarantine between November 20th and December 24th 2009.

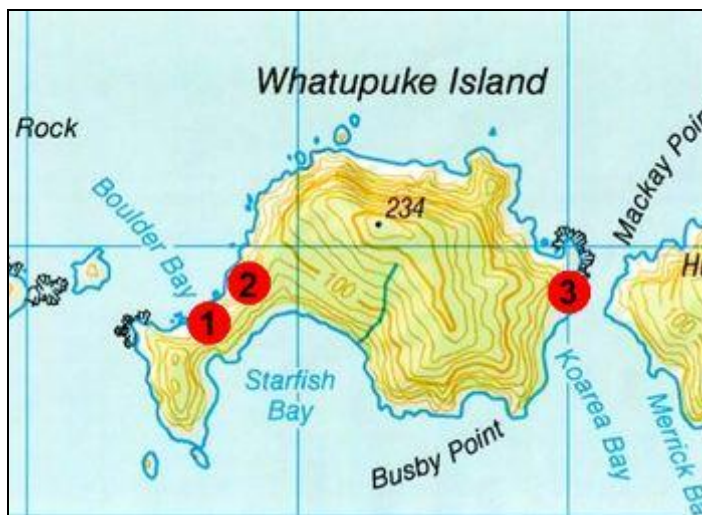
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Appendix 1: Maps showing the location of pitfall and minnow trap lines set on Lady Alice, Whatupuke and Coppermine Islands, November 2008 to December 2009



◀ **Lady Alice Island**

- 1: B Line, follows bait station Line B down the ridge from TM69.
- 2: Koputotara Bay (KT Bay).
- 3: South Cove, most traps set on the shoreline to the east of the stream into the bay.

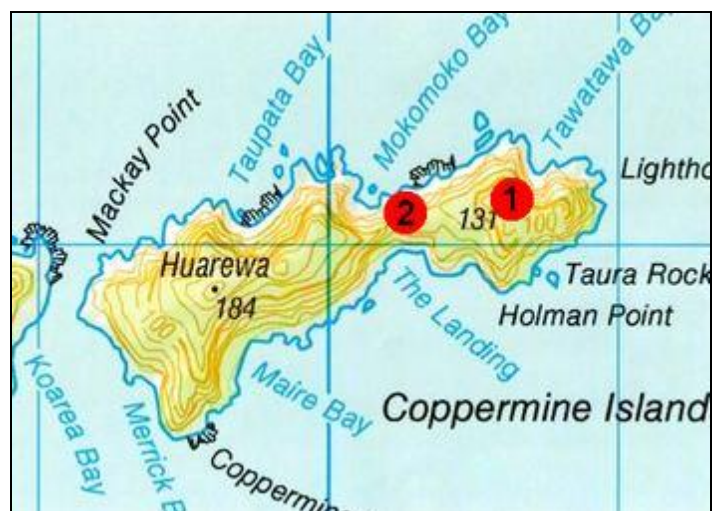


◀ **Whatupuke Island**

- 1: Boulder Bay (B Bay).
- 2: Boulder Bay ridge, down ridge from TMA4 to directly above Boulder Bay.
- 3: Koarea Bay (K Bay), permanent pitfalls set directly opposite the Coppermine Island channel, temporary pitfalls set at south end of the bay.

Coppermine Island ▶

- 1: Lighthouse
- 2: Coppermine Saddle



Appendix 2: Capture data for traps set on Whatupuke Island in November 2008 and February 2009, and set on Lady Alice Island in November 2009.

Date & Island	Location	Number of traps	Days set	Number of moko skink caught	Capture rate (moko/100TD)	Other species caught
Nov. 2008 Whatupuke	Boulder Bay	13 pitfalls	3	Nil (One caught by hand)	Nil	16 x <i>O. suteri</i> 1 x <i>C. ornata</i> 1 x <i>O. smithi</i> 8 x <i>C. townsi</i>
	Koarea Bay	17 pitfalls	2	3	9	3 x <i>H. duvauceli</i> 1 x <i>O. smithi</i> 1 x <i>C. macgregori</i>
	Koarea Bay	27 pitfalls	2	3	5.5	1 x <i>H. duvauceli</i> 1 x <i>C. macgregori</i>
Feb. 2009 Whatupuke	Boulder Bay	14 pitfalls	3	1	2	5 x <i>H. duvauceli</i> ¹ 46 x <i>O. suteri</i> ¹ 14 x <i>C. townsi</i>
	Koarea Bay	27 pitfalls	4	1	1	28 x <i>H. duvauceli</i> ² 4 x <i>O. suteri</i> ² 2 x <i>C. macgregori</i> 1 x <i>O. smithi</i>
Nov. 2009 Lady Alice	KT Bay	18 minnow	1	7	39	3 x <i>H. duvauceli</i>
	South Cove	14 minnow	1	1	7	1x <i>H. duvauceli</i> 1x <i>C. ornata</i>

Notes:

1. 1 x *H. duvauceli* and 7 x *O. suteri* were recaptures
2. 1 x *H. duvauceli* (recaptured twice) and 1 x *O. suteri* were recaptures

TD = Trap Days

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Appendix 3: Capture data for traps set on Lady Alice, Whatupuke and Coppermine Islands in December 2009.

Capture Island	Location	Number of traps	Days set	Number moko caught	Catch rate (moko skinks/100TD)	Number translocated	Other species caught
Lady Alice	B Line	12	3	33	92 (1 dead)	14	2 x <i>H. duvauceli</i> 1 x <i>H. pacificus</i>
	KT Bay	14	2	15	54	9	1 x <i>C. macgregori</i> 1 x <i>C. ornata</i>
	South Cove	8	2	4	25	1	Nil
Whatupuke	B Bay Ridge	10	2	15	75 (1 dead)	8	2 x <i>H. duvauceli</i>
	K Bay	14	2	16	57 (1 dead)	1	5 x <i>H. duvauceli</i> 2 x <i>O. suteri</i> 3 x <i>C. macgregori</i> 2 x <i>C. ornata</i>
	K Bay	18 pitfalls	2	2	6	Nil	1 x <i>H. duvauceli</i> 14 x <i>O. suteri</i> 2 x <i>C. ornata</i>
Coppermine	Lighthouse	8	2	13	81	6	7 x <i>H. duvauceli</i>
	Coppermine Ridge	7	2	15	107	3	1 x <i>H. duvauceli</i> 1 x <i>C. ornata</i>

TD = Trap Days

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Appendix 4: Moko skink data recorded at Massey University (Albany Campus) during quarantine between November 20th and December 24th 2009.

ID	Source location	Sex	Date in	Date out	Total days	Start weight (g)	End weight (g)	SVL (mm)	VTL (mm)	Tail condition	Test results
MK1	Lady Alice Is. - Koputotara Bay	f	20/11/09	24/12/09	34	5.33	5.90	66	85	regen= 22mm	negative
MK2	LA - KT Bay	f	20/11/09	24/12/09	34	5.10	4.80	69	74	regen= 29mm	negative
MK3	LA - KT Bay	f	20/11/09	24/12/09	34	3.70	4.00	60	67	original	negative
MK4	LA - KT Bay	f	20/11/09	24/12/09	34	3.35	3.70	60	54	regen= 37mm	negative
MK5	LA - KT Bay	m	20/11/09	24/12/09	34	4.20	4.50	65	59	regen= 41mm	negative
MK6	LA - KT Bay	f	20/11/09	24/12/09	34	4.12	3.90	60	84	original	negative
MK7	LA - KT Bay	m	20/11/09	24/12/09	34	3.44	3.40	60	69	regen= 50mm	negative
MS1	LA - South Cove	f	20/11/09	24/12/09	34	3.62	3.60	59	63	regen= 17mm	negative
M9	LA - B Line	m	11/12/09	24/12/09	13	3.79	3.70				negative
M10	LA - B Line	f	11/12/09	24/12/09	13	3.67	3.70				negative
M11	LA - B Line	f	11/12/09	24/12/09	13	4.86	4.60				negative
M13	LA - B Line	m	11/12/09	24/12/09	13	3.69	3.70				negative
M15	LA - B Line	f	11/12/09	24/12/09	13	3.79	3.80				negative
M16	LA - B Line	f	11/12/09	24/12/09	13	5.66	5.50				negative
M17	LA - KT Bay	f	11/12/09	24/12/09	13	6.71	6.80				negative
M18	LA - KT Bay	f	11/12/09	24/12/09	13	5.38	5.30				negative
M19	LA - KT Bay	f	11/12/09	24/12/09	13	5.75	5.70				negative
M20	LA - KT Bay	m	11/12/09	24/12/09	13	4.99	4.70				negative
M21	LA - KT Bay	f	11/12/09	24/12/09	13	3.83	3.70				negative
M22	LA - KT Bay	f	11/12/09	24/12/09	13	4.14	4.20				negative
M23	LA - KT Bay	f	11/12/09	24/12/09	13	6.01	6.10				negative
M24	LA - KT Bay	f	11/12/09	24/12/09	13	4.04	4.10				negative
M25	LA - South Cove	f	11/12/09	24/12/09	13	4.21	4.40				negative
M26	LA - B Line	m	11/12/09	24/12/09	13	5.35	4.90				negative
M27	LA - B Line	f	11/12/09	24/12/09	13	5.21	5.60				negative
M28	LA - B Line	m	11/12/09	24/12/09	13	3.30	3.20				negative
M29	LA - B Line	f	11/12/09	24/12/09	13	4.30	3.90				negative
M30	LA - B Line	f	11/12/09	24/12/09	13	5.20	5.40				negative
M31	LA - B Line	m	11/12/09	24/12/09	13	3.80	3.60				negative
M32	LA - B Line	m	11/12/09	24/12/09	13	3.20	3.10				negative
M33	Whatupuke Is. - B Bay ridge	m	11/12/09	24/12/09	13	4.10	3.70				negative
M34	WI - BB ridge	f	11/12/09	24/12/09	13	3.80	3.90				negative
M35	WI - BB ridge	f	11/12/09	24/12/09	13	5.50	5.60				negative
M36	WI - BB ridge	f	11/12/09	24/12/09	13	5.80	5.90				negative
M37	WI - BB ridge	m	11/12/09	24/12/09	13	6.60	6.00				negative
M38	WI - BB ridge	f	11/12/09	24/12/09	13	4.00	4.30				negative
M39	WI - BB ridge	f	11/12/09	24/12/09	13	5.30	5.30				negative
M40	WI - BB ridge	m	11/12/09	24/12/09	13	3.60	3.40				negative
M41	Coppermine Is. - Lighthouse	m	11/12/09	24/12/09	13	4.40	4.40				negative
M42	CI - L	f	11/12/09	24/12/09	13	4.80	5.00				negative
M43	CI - L	f	11/12/09	24/12/09	13	4.60	4.40				negative
M44	CI - L	f	11/12/09	24/12/09	13	4.10	4.10				negative
M45	CI - L	f	11/12/09	24/12/09	13	7.50	5.00				negative
M46	CI - L	m	11/12/09	24/12/09	13	5.00	4.70				negative
M47	CI - West ridge	m	11/12/09	24/12/09	13	4.30	4.00				negative
M48	CI - West ridge	f	11/12/09	24/12/09	13	4.60	4.50				negative
M49	CI - West ridge	f	11/12/09	24/12/09	13	4.50	4.60				negative
M50	WI - Koarea Bay	f	11/12/09	24/12/09	13	5.60	5.80				negative
M51	LA - B Line	f	11/12/09	24/12/09	13	3.70	4.80				negative