

Shore Skink Survey, Motuora, 19-24 January 2013

Fieldwork team: Roger Harker (RH), Nick Harker (NH) and Tim Harker (TH)

Summary

This report covers the third of the programmed series of annual trips to monitor the establishment of a population of shore skinks at Home Bay (Appendices 1 and 2 cover the 2011 and 2012 surveys, respectively). The number of shore skinks was the same as last year (13 of which 6 were gravid females and 1 was a neonate), but we are optimistic that the shore skink population is continuing to grow. This conclusion is supported by the capture of the same number of shore skinks in what seems to have been a poor overall survey (40 skinks of all species captured this year compared to 77 skinks in 2012). Furthermore the rate at which shore skinks were recaptured was much lower this year (38% of observations related to lizards captured on previous days in 2013 compared to 77% in 2012) suggesting that we had captured a smaller proportion of the total population.

Method

Additional 4L plastic buckets, wooden covers and Onduline refuges were purchased and prepared (as described in Monitoring Plan, Nov 2010¹) to replace those that had deteriorated or been lost over the last few years. On the 22nd December 2012, the fieldwork team re-positioned the pitfall traps and replace the refuges as appropriate. The pitfall traps in Line B and C had been left in position over winter to serve as markers for re-establishing the monitoring grid. It proved difficult to relocate all the pitfall traps as some had been covered by the moving dune and another simply not found despite a considerable search. The three lines of traps (total= 41, 21 in A line, 10 in B line, 10 in C line) were placed as indicated in the original monitoring plan. Four planks of wood provided additional objects for skinks to shelter under and an additional four ‘Onduline’ refuges were placed along the front line of the dune (in addition to those replaced because they had been covered by the dune). The arrangement and identification of pitfall traps, refuges and planks is provided in Figure 1.

RH, NH and TH landed and activated the pitfall traps on the 19th of January. The survey was carried out over six days – one day for setting up the traps and five days of checking the traps and hand-searching (as was the protocol for February 2011). The allocation of survey dates as Day 1 to Day 6 is the same as in 2012.

Day 1	19 th Jan set up
Day 2 – 6	20 th -24 th Jan survey

Pitfall traps were baited with cat food, which included sardine as an ingredient: ‘Select’ (Woolworths) ‘Ocean fish with Whitebait’ (product of Thailand). The ingredients were: fish broth, tuna, sardine, whitebait, thickener, sugar, salt, gelling agent, natural flavour, vitamins and minerals; and the product contained crude protein (7.0%), crude fat (1.0%), crude fibre (1.0%) and salt (0.3%). This was the closest product we could find to those cat foods used

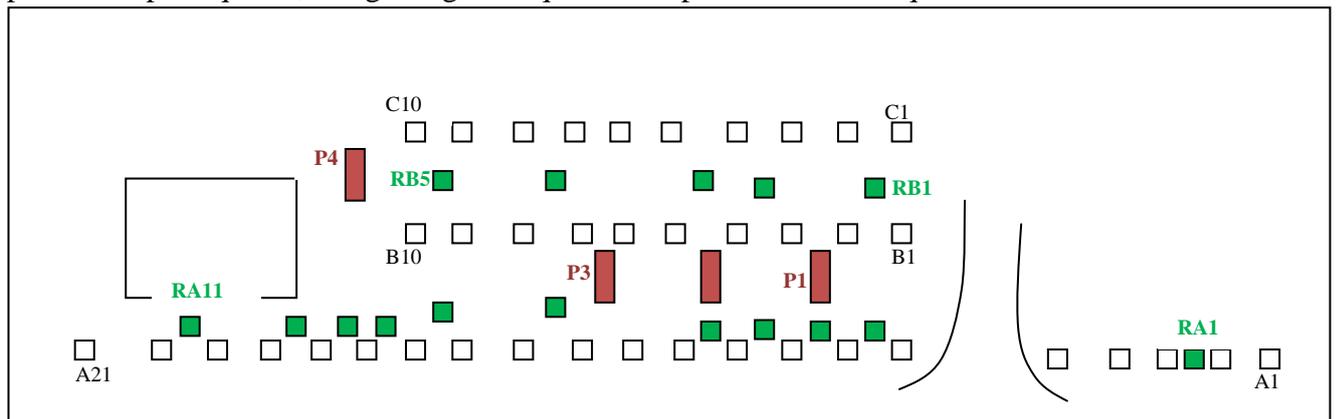
¹ Rixon M, van Winkle D, Baling M (2010). Monitoring plan for Shore skink, Duvacel’s gecko, Common gecko and Tuatara on Tiritiri Matangi and Motuora Islands, Hauraki Gulf, Auckland. Prepared for Supporters of Tiritiri Matangi Island & Motuora Restoration Society.

previously: Gourmet Sardine Supreme (Heinz Watties™, Hastings) in 2011 and Pams Savoury Salmon Pate in 2012. The bait was replaced every day.

Checking pitfall traps and hand-searching were carried out between 9am and 1pm each day. After Day 1, when the traps were set up for the first time, the routine was as follows: traps were opened and checked systematically; any skinks found in the traps were processed and released before moving on. Hand-searches under logs, planks and the artificial refuges were carried as we came across them during monitoring of pitfall traps.

On Day 6 the traps were opened and captive skinks processed as before. Then traps were deactivated or removed according to revised protocol developed in response to storm damage. Traps in Lines C and B, which were more distant from the seaward edge of the dune, were deactivated as described in the monitoring plan and left in place as landmarks for placement of traps next year. Traps in Line A were removed and the holes filled in to avoid further loss of traps in storms. The 21 sets of buckets, lids and wooden covers, have been stored in the end area of the shade houses. All the other equipment and paperwork have been stored at the Harkers' (97 Namata Road, One Tree Hill, Auckland 1061; Tel 09 6366507).

Figure 1. Convention for identification of location of refuges and planks used in 2013; pitfalls = open squares, refuges = green squares and planks = brown squares.



Weather 2012

Day	No of captures	Weather
1	8	Sunny and still (breeze increase over morning and windy after lunch)
2	17	Overcast / drizzle / slight Breeze
3	11	Overcast / slight breeze / comfortable temperature
4	2	High cloud (clearing) /medium breeze / comfortable to hot temperature
5	6	Sunny with some cloud / warm (comfortable) / slight breeze (dropping over assessment)
6	4	Clear sky / sunny / no breeze / warm
Total	48	(NB: This number includes recaptured skinks)

Results

Over the six-day period a total of 40 skinks were captured representing 20 coppers, 7 mokos and 13 shore skinks. Details of snout-to-vent length (SVL), weight and the number of recaptures are provided in Table 1.

Table 1. Details of adult (non-gravid), adult (gravid) and sub-adult skinks captured in 2013. Values represent the number of individuals captured, the mean snout to vent length and mean weight along with the number of recaptures.

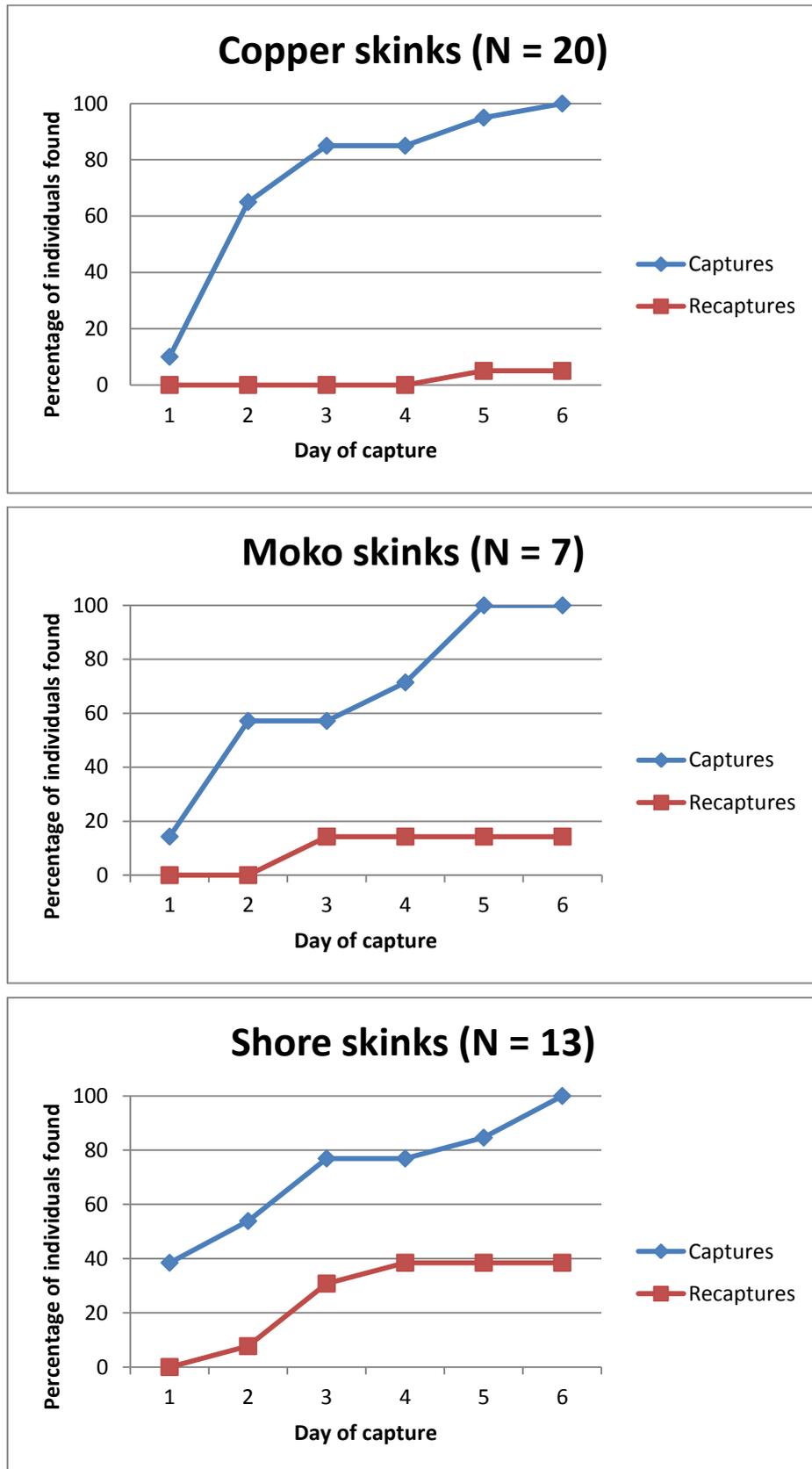
Species		Total	Adult (Non-gravid)	Adult (Gravid)	Sub-Adult	Neonate	Recaptures
Copper	Number of Individuals	20	10	4	6	0	1
	Mean SVL (mm)	–	54.5 (2.4)*	53.8 (1.4)	46.5 (2.5)		–
	Mean weight (g)	–	3.3 (0.4)	3.7 (0.3)	1.7 (0.3)		–
Moko	Number of Individuals	7	5	2	0	0	1
	Mean SVL (mm)	–	61.0 (2.0)	67.0 (6.0)			–
	Mean weight (g)	–	4.3 (0.5)	6.6 (1.6)			–
Shore	Number of Individuals	13	6	6	0	1	6
	Mean SVL (mm)	–	58.2 (4.5)	66.8 (3.9)	–	28**	–
	Mean weight (g)	–	3.7 (0.8)	7.1 (0.6)	–	0.5	–

*Values in bracket represent the standard deviation of the mean.

**Single individual

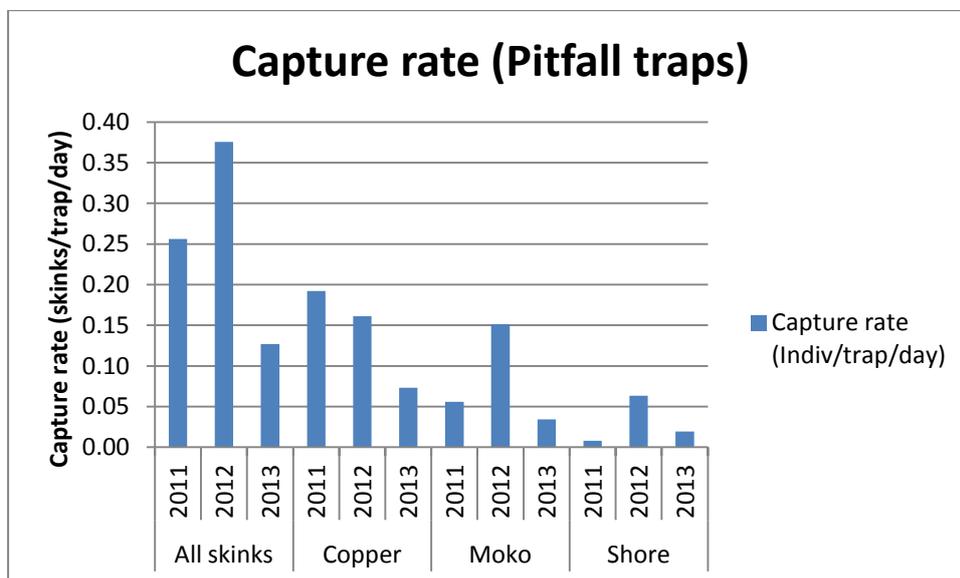
The cumulative number of individuals captured along with the cumulative recaptures are a good representation of the proportion of the population being sampled during monitoring and are presented in Figure 2. It is notable that a high proportion of shore skinks are being recaptured, although at 38% this was much lower than the 77% recapture rate obtained in 2012.

Figure 2. Cumulative curves showing the new individuals captured across the 6-day monitoring period as a percentage of the total number of skinks captured.



Monitoring this year resulted in the smallest number of captures so far. Only 40 skinks were caught in 2013, which compares with 77 skinks in 2012 and 54 skinks in 2011. This suggests that either the skink populations have not done so well this past season or that skinks were less active over the monitoring period and therefore less were caught. The most objective comparison of seasons is obtained from capture rates in pitfall traps (calculated as the total number of individual skinks divided by the number of traps and the number of days). As might be expected the trapping rates decline for all skinks (Figure 3). There is a trend showing a decline in copper skinks, but it is probably too early to be sure with only three season's results.

Figure 3. Population assessments according to capture rate in pitfall traps – comparison of 2011, 2012 and 2013 monitoring periods. Values represent number of skinks per trap per day.



Shore skinks at Home Bay

The focus of the project is on the shore skinks released at Home Bay in February 2011. The first monitoring trip was five days after the skinks were released. Only four of the 24 individuals released were recaptured. The two subsequent monitoring trips (2012 and the current trip) have been more successful with thirteen shore skinks captured each year. Evidence of progeny being recruited into the population is provided by the presence of gravid females in both 2012 and 2013 surveys as well as the observation and capture of one sub-adult on each of two routine volunteer days (NH & TH) earlier in 2012, and the discovery of a neonate during the current study. Over the past two years the population has been maintained, if it has not increased.

Shore skinks at Pohutukawa Bay

The first release of shore skinks had occurred at Pohutukawa Bay some years prior to 2011. A storm that occurred shortly after the release is thought to have compromised the successful establishment of a population at this location. The site is no longer monitored using pitfall traps, but the Monitoring Plan (Nov 2010) recommends hand-searching every alternate year. Roger, Nick and Tim Harker visited Pohutukawa Bay on 23rd January 2013. Flotsam and leaf litter on the beach immediately below the cliff were searched. Searching by the three fieldworkers was from 12.55AM to 1.40PM (2 hours and 15min total search time). No skinks of any species were seen.

Acknowledgements

Thanks to the Motuora Island Rangers, Toby and Sian for their hospitality in allowing us to stay in the bunkhouse and for their advice and help while we were on the island.

Roger Harker

15 February 2013

APPENDIX 1

Shore Skink Survey, Motuora, 2 – 7 January 2012

Fieldwork team: Roger Harker (RH), Nick Harker (NH) and Tim Harker (TH)

Summary

This report covers the second of the programmed series of annual trips to monitor the establishment of a population of shore skinks at Home Bay. Monitoring was very successful. Thirteen shore skinks were captured and of these ten (77%) were gravid (pregnant). Over the past year, individuals from the original release have settled into the site, those that were gravid have given birth, and the mature skinks have successfully mated again.

Method

The fore dune was damaged by two cyclonic storms in January 2011 and this affected monitoring in February 2011 (see Appendix). Over the past year the fore dune had recovered regaining sand and it was possible to return to the original design for the pitfall trap monitoring layout.

Additional 4L plastic buckets and wooden covers were purchased and prepared (as described in Monitoring Plan, Nov 2010²) to replace those lost in the storm in 2011. On the 27th November 2011, the fieldwork team re-positioned the pitfall traps and checked and carried out maintenance on refuges as appropriate. The pitfall traps in Line C had been left in position over winter to serve as markers for re-establishing the monitoring grid. It proved difficult to relocate all the traps and wooden covers in Line C – one had been covered by the moving dune and another simply not found despite a considerable search. The three lines of traps (total= 41, 21 in A line, 10 in B line, 10 in C line) were placed as indicated in the original monitoring plan. In addition, four planks of wood (~1m x 0.4m x 5cm) that had been part of the demolished wharf were used as additional objects for skinks to shelter under and were placed between ‘Onduline’ refuges along the front of the dune. All pitfall traps were deactivated prior to leaving.

The intention was for RH, NH and TH to land and activate the pitfall traps on the 2nd of January and for Liz Maire to join them for monitoring on the following day. Unfortunately, Liz was urgently recalled to work by DOC to help with the emergency associated with a missing volunteer on Raoul Island and did not manage to get out to Motuora for skink monitoring. The survey was carried out over six days – one day for setting up the traps and five days of checking the traps and hand-searching (as was the protocol for February 2011). The allocation of sample dates as Day 1 to Day 6 differs from that used in 2011 (Day 0 to Day 5) as a reflection that a number of skinks are caught while activating the pitfall traps – they were hiding under the wooden lids.

Day 1 2nd Jan set up
Day 2 – 6 3rd-7th Jan survey

² Rixon M, van Winkle D, Baling M (2010). Monitoring plan for Shore skink, Duvacel’s gecko, Common gecko and Tuatara on Tiritiri Matangi and Motuora Islands, Hauraki Gulf, Auckland. Prepared for Supporters of Tiritiri Matangi Island & Motuora Restoration Society.

Pitfall traps were baited with a sardine-based, salmon flavoured cat food (Pams Savoury Salmon Pate, Pam Products Ltd, Auckland; made in Thailand). The ingredients were: sardines, salmon, water, polysaccharide gum, sunflower seed oil, vitamins & minerals, taurine, colour (172); and the product contained crude protein (12% min), crude fat (1% min), crude fibre (1% max) and salt (1.5% max). This was the closest product we could find to match the Gourmet Sardine Supreme (Heinz Watties™, Hastings) cat food used in 2011. The bait was replaced at least every two days and more frequently when needed.

Checking pitfall traps and hand-searching were carried out between 8am and 12pm each day. After Day 1, when the traps were set up for the first time, the routine was as follows: traps were opened and checked systematically; any skinks found in the traps were processed and released before moving on to the next. This included shore skinks as well as moko and copper skinks. Hand-searches under logs, planks and the artificial refuges were then carried out.

On Day 6 the traps were opened and captive skinks processed as before. Then traps were deactivated or removed according to revised protocol developed in response to storm damage. Traps in Lines C and B, which were more distant from the seaward edge of the dune, were deactivated as described in the monitoring plan and left in place as landmarks for placement of traps next year. Traps in Line A were removed and the holes filled in to avoid further loss of traps in storms. The 21 sets of buckets, lids and wooden covers, have been stored in the end area of the shade houses. All the other equipment and paperwork have been stored at the Harkers' (97 Namata Road, One Tree Hill, Auckland; Tel 09 6366507).

Weather 2012

Day	No of Captures	Weather
1	9	Overcast / humid / blustery wind
2	31	Overcast / humid / no wind
3	13	Overcast / breezy
4	18	Overcast / light drizzle / no wind
5	15	Sunny / warm / no wind
6	7	Drizzle clearing / wind not strong (easy to weigh) / warm
Total	93	

Results

Over the six-day period a total of 77 skinks were captured representing 33 coppers, 31 mokos and 13 shore skinks. Details of snout-to-vent length (SVL), weight and the number of recaptures are provided in Table 1.

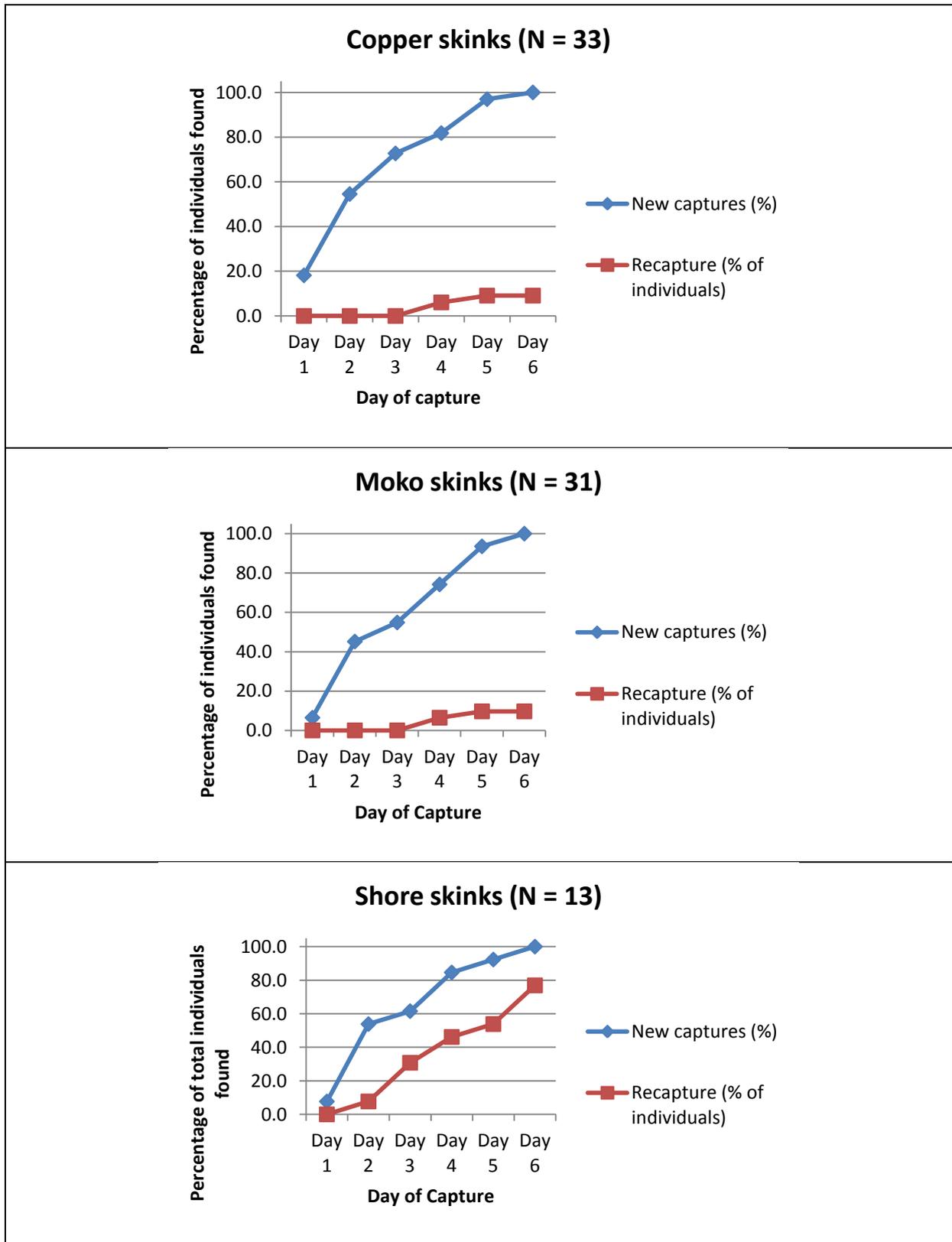
Table 1. Details of adult (non-gravid), adult (gravid) and sub-adult skinks captured in 2012. Values represent the number of individuals captured, the mean snout to vent length and mean weight along with the number of recaptures.

Species		Total	Adult (Non-gravid)	Adult (Gravid)	Sub-Adult	Recaptures
Copper	Number of Individuals	33	19	12	2	3
	Mean SVL (mm)	–	50.7 (3.3)*	56.1 (2.9)	38.5 (1.5)	–
	Mean weight (g)	–	2.8 (0.6)	4.1 (0.9)	1.1 (0.1)	–
Moko	Number of Individuals	31	13	11	7	3
	Mean SVL (mm)	–	61.3 (4.6)	63.9 (3.2)	48.7 (3.1)	–
	Mean weight (g)	–	4.5 (0.9)	5.8 (1.0)	2.3 (0.4)	–
Shore	Number of Individuals	13	3	10	0	10
	Mean SVL (mm)	–	60.0 (6.0)	67.8 (1.9)	–	–
	Mean weight (g)	–	4.1 (1.2)	6.7 (0.4)	–	–

*Values in bracket represent the standard deviation of the mean.

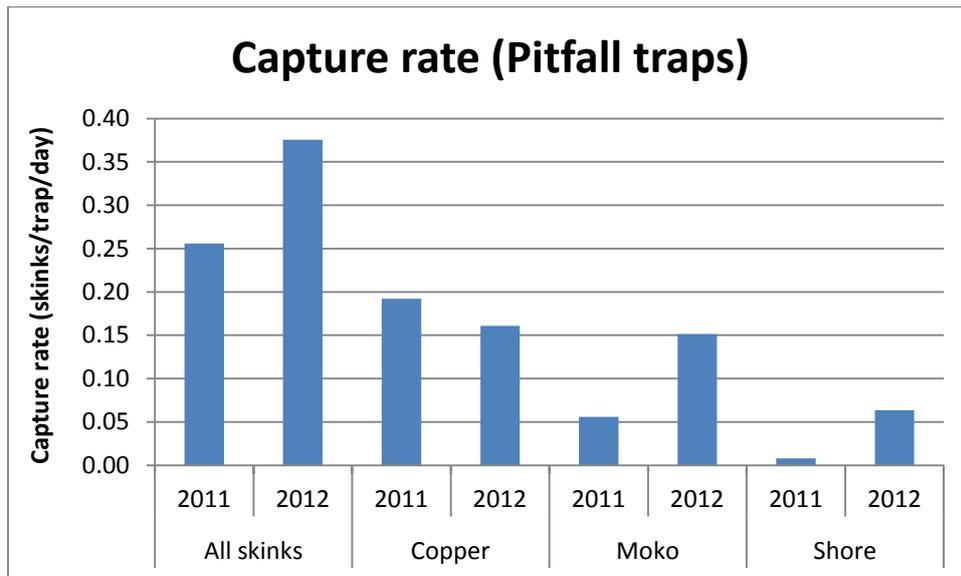
The cumulative number of individuals captured along with the cumulative recaptures are a good representation of the proportion of the population being sampled during monitoring and are presented in Figure 1. It is notable that a high proportion of shore skinks are being recaptured.

Figure 1. Cumulative curves showing the new individuals captured across the 6-day monitoring period as a percentage of the total number of skinks captured.



Monitoring this year was more successful than 2011 with more skinks being caught than in 2011 (i.e. 77 skinks in 2012 compared to 54 skinks in 2011). This shows that entire skink population has done well at Home Bay over the last year. The most objective comparison of the two seasons is obtained from capture rates in pitfall traps (calculated as the total number of individual skinks divided by the number of traps and the number of days). The results show an increase in trapping rate for shore and moko skinks and a slight decrease in the trapping rate for copper skinks (Figure 2).

Figure 2. Population assessments according to capture rate in pitfall traps – comparison of 2011 and 2012 monitoring periods. Values represent number of skinks per trap per day.



Shore skinks at Home Bay

The focus of the project is on the shore skinks released at Home Bay in February 2011. The first monitoring trip was five days after the skinks were released. Only four of the 24 individuals released were recaptured. By comparison the current monitoring was more successful. Thirteen shore skinks were captured and of these ten (77%) were gravid (pregnant). Over the past year, individuals from the original release have settled into the site, those that were gravid have given birth, and the mature skinks have successfully mated again. One of the captured shore skinks (51 mm SVL) was marginally longer than the 50 mm SVL threshold to progress from sub-adult to adult age category. Speculatively, this suggests neonates born in 2011 have been recruited into the adult population (and that the proportion of sub-adults to adults at this time of year is similar for shore skinks as that observed for other species at the site).

Shore skinks at Pohutukawa Bay

The first release of shore skinks had occurred at Pohutukawa Bay some years prior to 2011. A storm that occurred shortly after the release is thought to have compromised the successful establishment of a population at this location. The site is no longer monitored using pitfall traps, but the Monitoring Plan (Nov 2010) recommends hand-searching every alternate year. Roger, Nick and Tim Harker visited Pohutukawa Bay on 4th January 2012. Flotsam and leaf litter on the beach immediately below the cliff were searched along with the part of the cliff where original pitfall traps had been located. Searching by the three fieldworkers was from 1.50 to 2.20PM (1.5h total search time). Six copper skinks were caught or positively identified, but no shore skinks were seen.

Acknowledgements

Thanks to the Motuora Island Rangers, Toby and Sian for their advice and help while we were on the island and for getting us back to the mainland when the water taxi was unable to pick us up.

Roger Harker & Liz Maire

18 January 2012

APPENDIX 2

Shore Skink Survey, Motuora, 10 – 15 February 2011

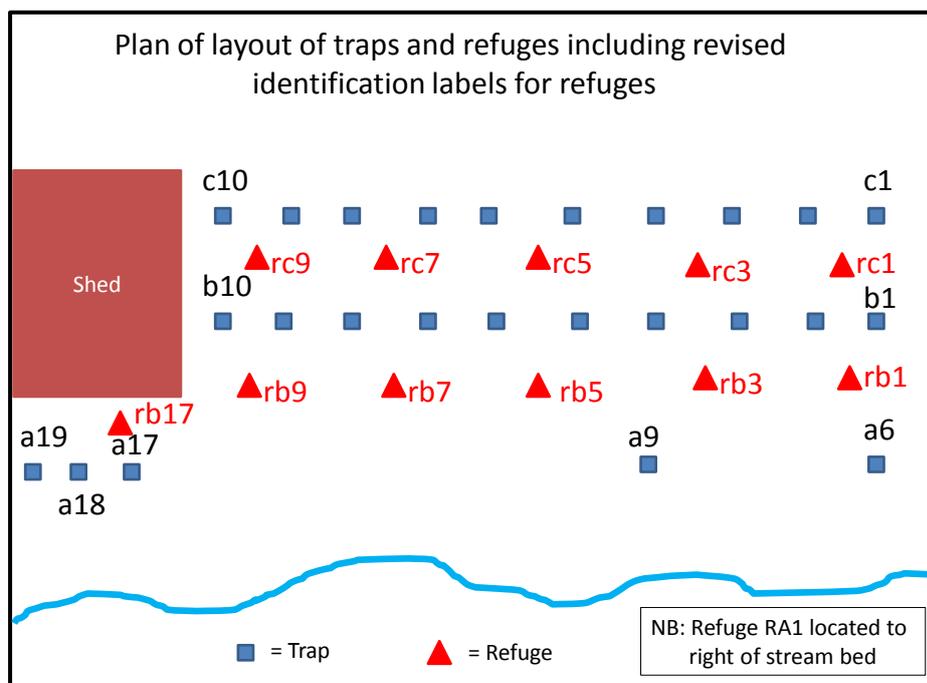
Fieldwork team: Liz Maire (LM, day 1, 2 and 3), Roger Harker (all days-RH), Nick Harker (all days - NH) and observer Tim Harker (TH, day 2 and 3))

Timing

The release of the shore skinks at this site occurred on 5th February 2011, 5 days before the start of the survey.

Method

The three lines of traps (initial trap total= 39, 19 in A line, 10 in B line, 10 in C line) had been placed in position 27-28 November, however during two cyclonic storms in January 2011, the front edge of the dune was damaged and fourteen traps lost. It was decided not to add further lines further inland but to carry out the survey with the remaining traps (final trap total = 25, 5 in A line, 10 in B line, 10 in C line)



Photographs of survey site before and after storm

Before (28-11-2010)³



After (15-2-2011)



The survey was carried out over six days – one day for setting up the traps and five days of checking the traps and hand-searching.

Day 0 10th Feb set up (although one skink was caught in a trap and processed)

Day 1 – 5 11 – 15th Feb survey

³ Image from: Rixon M, van Winkle D, Baling M (2010). Monitoring plan for Shore skink, Duvacel's gecko, Common gecko and Tuatara on Tiritiri Matangi and Motuora Islands, Hauraki Gulf, Auckland. Prepared for Supporters of Tiritiri Matangi Island & Motuora Restoration Society.

Checking and hand-searching were carried out between 8am and 10.30am each day apart from day 1 where the processing stretched to 12.15pm due to the large number of skinks found. After Day 0, when the traps were set up for the first time, the routine was as follows:

Traps were opened and checked systematically; any skinks found in the traps were processed and released before moving on to the next. This included shore skinks as well as moko and copper skinks. Once each trap had been cleared the bait was re-laid if necessary (renewed every second day) and traps re-set. Hand-searches under logs and the artificial refuges were then carried out.

On Day 6 the traps were opened and captive skinks processed as before. Then traps were deactivated or removed according to revised protocol developed in response to storm damage (Melinda Rixon, personal communication). Traps in Line C, which were more distant from the seaward edge of the dune, were deactivated as described in the monitoring plan and left in place as landmarks for placement of traps next year. Traps in Line B and the remaining five traps in Line A were removed and the holes filled in to avoid further loss of traps if erosion continues. The 15 sets of buckets, lids and wooden covers, along with sets recovered immediately following storms have been stored in the end area of the shade houses. All the other equipment and paperwork have been stored at the Harkers' (97 Namata Road, One Tree Hill, Auckland; Tel 09 6366507).

Bait

Gourmet Sardine Supreme (Heinz Watties™, Hastings) cat food (Ingredients: Sardines, Gel, Salt, Food Colouring, Smoked salmon flavouring; crude protein 8.5% minimum, crude fat 1.0% minimum and crude fibre 1.0% minimum).

Weather

Day	No of Captures	Weather	
0	1	Hot, sunny	New bait
1	23	Hot, sunny	
2	13	Showery / overcast	New bait
3	6	Overcast/ warm	
4	9	Sunny/ no wind	New bait
5	10	Sunny/ warm	
Total	62		

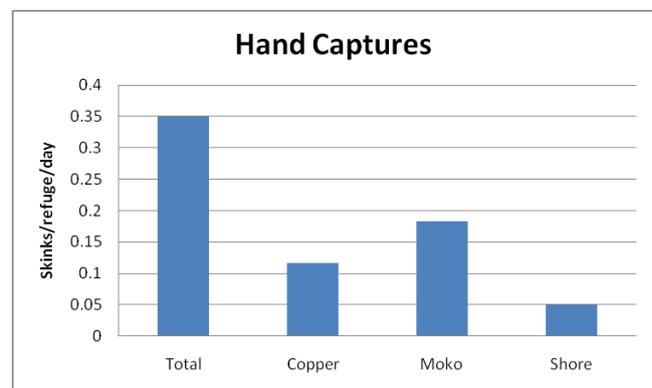
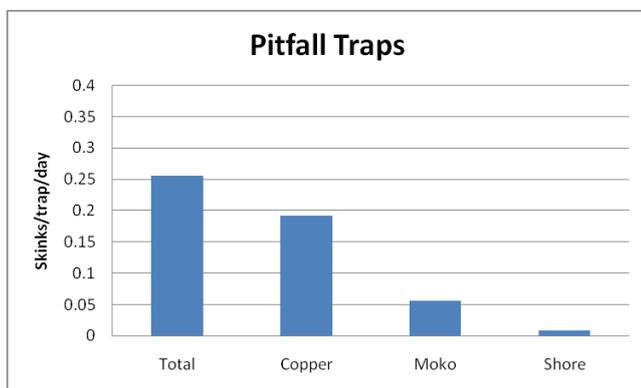
Personnel

Due to the late organisation of the survey (due to delay in shore skink release), Liz Maire was not able to stay for the whole time. Roger's sons joined the team, Nick has had skink handling practice, Tim for the most part observed. The team size was good, although if more skinks are found in further years it would be good to have a minimum of 4 competent handlers (2 teams of 2) for the whole period as the site is quite hot at this time of year for prolonged work.

Results

	Total	Copper	Moko	Shore
Number of Captures	62	32	20	10
Number of Recaptures	8	1	2	5
Total individuals	53*	31	18	4*
Recaptures (%)	12.9	3.1	10	50

*On day 3 a pair of shore skinks was found under a refuge but one escaped before being captured, we suspect this animal was a recapture, as the same pair had been found under the same refuge on day 1 and 2. We have not included this skink in the individual total.



A total of four confirmed individual shore skinks were caught. One of these was a gravid females (caught in a trap), the other three were adults (caught under refuges/logs). No juveniles were caught. There were five* recaptures.

Location of the captured shore skinks

Location of population of SHORE SKINKS (based on total individuals)	Trap	Refuge	Total
Seaward edge of dune (Trap line A, Refuge Line A & B)	1	3	4
Mid-dune (Trap line B, Refuge Line C)	0	0	0
Land-side of dune (Trap Line C / plank)	0	0	0

All the four individual shore skinks were caught in the seaward edge of dune area (trap line A, refuge line A and B), none further inland (mid dune or back of dune).

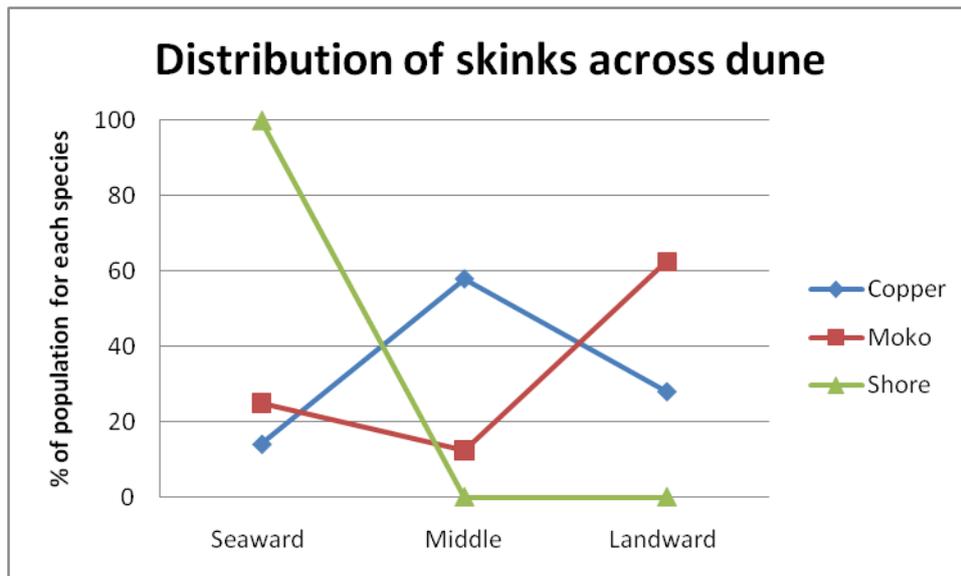
All animals appeared in good condition, with no mites, marks or tail regeneration. One shore skink lost its tail during the capture process (caught in a refuge).

The gravid female weighed 4.75g, the other 3 adults weighed ranged in weight from 3.5 to 5.0g.

Other species - Moko and Copper Skinks

	Neonate	Juvenile	Sub-Adult	Adult	Gravid	TOTAL
Copper	2	0	3	24	2	31
Moko	4	1	3	10	0	18

Other species caught included thirty one individual copper skinks and eighteen individual moko skinks. The copper skinks dominated the mid dune habitat and the moko skinks were predominant in the back area of the dunes.



Comments for future reference

1. The survey went smoothly with between 2 and 4 personnel involved over the 6 days. Camping was a good option with the potting shed being available for cooking and quiet time away from the campers. No need to book the bach in future years.
2. From the sixty two captures, animals were handled safely apart from one tail loss. They were released in good condition as far as we could tell.
3. The GPS failed to turn on despite Dean's persistence so it couldn't be used.
4. It needs to be clear which day is day 1 – we made the assumption this was the first day of checking the pit falls, not the arrival and set up day (called Day 0)
5. A useful resource would be a one page photo ID sheet showing the following for each of the 3 species:
 - Image of skink head in profile with notes about shape
 - Image of belly with notes about colouring/ markings
 - Image of top markings – notes as above
 - Weight ranges

Also separate diagrams to show neonate/ adult/ gravid for each species as Mokos are bigger animals and hard to classify as neonate or adult using the shore skink guide

6. We processed all skinks caught, but were not sure if this was what we were required to do.
7. It would be of benefit to have the survey site mapped including both traps and refuges as 80% of shore skinks were caught under these. With a GPS this could be achieved on the set up day, although better to achieve beforehand as computers on the mainland can be used to prepare a map.

Liz Maire and Roger Harker
21 February 2011