



# Tokoeka Monitoring Murchison Mountains 2011/2012



Department of  
Conservation  
*Te Papa Atawhai*

# Tokoeka Monitoring Murchison Mountains 2011/12

## Adult and sub-adult monitoring of Northern Fiordland Tokoeka in the Murchison Mountains Special Area 2011/12

Hannah Edmonds, Department of Conservation, Te Anau Area Office

OCTOBER 2012

*Cover image credit (Hannah Edmonds):* Jono More with “Boakes” and female, Snag Burn Valley 2012

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# Summary

Monitoring of northern Fiordland tokoeka (*Apteryx australis australis*) in the Murchison Mountains, Fiordland National Park, began in 2003. The main aim of the project was to ascertain whether trapping is necessary for continued survival of tokoeka in the Murchison Mountains, and if so, whether the present low intensity, landscape-style stoat control operation in the Murchison Mountains can increase chick survival to a level for the population to be self sustaining.

Results from 2003 to 2009 are summarised in a report titled Fiordland tokoeka chick recruitment study 2003 to 2009 (Tansell, 2010a). Further adult and sub-adult survival monitoring was carried out in 2009/10 to March 2012.

This report presents the results of the 2011/12 season, during which survival monitoring was carried out for adults and one sub-adult only. This season 19 adult males as well as 1 adult female and 1 sub-adult female were monitored. One death was recorded.

This work was made possible by generous funding from Kirra Tours, via the Bank of New Zealand Save the Kiwi Trust.

## 1. Introduction

The principal threat to kiwi (*Apteryx australis*) throughout Fiordland is stoat (*Mustela erminea*) predation on chicks. A study of Fiordland tokoeka, carried out in the Clinton Valley (2001-2005) was the first attempt to quantify this threat (Edmonds, 2005). The Clinton Valley study also provided the first data to be gathered on other population parameters such as adult survivorship and productivity.

An area of low intensity, large - scale stoat control was established in the Murchison Mountain Special (Takahe) Area in 2001. The main aim of the programme is to determine whether low intensity, landscape style stoat trapping will increase takahe (*Porphyrio hochstetteri*) survival and productivity within the Murchison Mountains. It is reasonable to expect that trapping should also benefit other sensitive species resident in the area, such as Fiordland tokoeka. To ascertain if the trapping program is also sufficient for kiwi protection, a monitoring program was established in 2003. The original aims of the study were to:

- Investigate kiwi productivity and chick survival in the Murchison Mountains.

- Determine if the current level of stoat control in the Murchison Mountains protects kiwi chicks.
- Investigate the population density of kiwi in the Murchison Mountains.

Additional aims were identified to address whether the population will be self-sustaining in the presence and absence of low intensity landscape scale stoat control:

- Determine adult survival of Fiordland tokoeka.
- Determine sub-adult survival of Fiordland tokoeka.
- Develop a population model for Fiordland tokoeka.

## 2. Methods

### ***2.1 Survival Monitoring***

Survival monitoring was carried out using radio telemetry. Methods used are described in detail in Tansell (2010a).

Sky ranger technology was used this year for takahe monitoring in the Murchison Mountains, therefore we used the opportunity to monitor kiwi, for little cost. Sky Ranger is the latest innovation allowing signals from the transmitters to be picked up from the air. A fixed-wing aircraft flies in a grid-pattern, picking up data simply and effectively. The type of egg-timer transmitters used on kiwi in 2011/12 however were not compatible to Sky ranger technology so mortality could not be detected, only location data. Mortality information had to be gathered from helicopter flights, and we utilised programmed takahe monitoring flights for cost effectiveness. All kiwi were caught and had transmitters removed in March 2012, marking the culmination of the project.

### ***2.2 Survival Estimates***

In this study kiwi chick survival is determined separately for trapped and non-trapped areas while adult survival, sub-adult survival and hatching success samples are pooled.

### ***2.3 Stoat Trapping***

The current stoat trapping network consisting of 3, 016 DOC 150 traps in double set tunnels covering 51,000ha of the Murchison Mountains Special

Area was extended in September 2012, with 934 new traps in 417 double set tunnels and 100 single set “run through” tunnels. Traps were checked quarterly in the past, but this has now been increased to at least six times per annum, depending on stoat numbers.

## 3. Results

### ***3.1 Survival Monitoring***

#### **Adults**

Of the 20 adults monitored, one adult death was recorded. An adult male named Kopipi was found dead in an old slip site in the Mystery Burn. Cause of death is unknown. The bird had been dead for 60 days when found in March 2012 and the skull was missing.

#### **Sub-adult**

One female sub-adult named Ma hatched in the 2008/09 season and was monitored from 2009 – March 2012. This bird was hatched in Takahe Valley, and travelled as far as Point Burn. She returned to Takahe Valley, where she was captured in March 2012 in a burrow with her father.

### ***3.2 Survival Estimates***

The principal findings were that the kiwi population in the Murchison Mountains would be in slow decline (1.29% per annum) in the absence of trapping, while trapping results in a stable or very slightly increase in population (1.07% per annum). This is a change from the 2010/11 results of 1.22% decline in the non-trapped area and an increase of 1.12% in the trapped area. The adult survival estimate also changed this season after one adult death was observed, from 27 to 26 years.

#### **Survival estimates were as follows:**

- Adult productivity was an average 0.82 eggs per male per annum, over an estimated lifespan of 26 years resulting in an average 21 eggs in a lifetime.
- Hatching success: 46.58%
- Chick survival (including chicks that disappeared before transmitter attachment):
  - Trapped area: 37.09% (95% CI: 0.1902% - 55.28%)

- Non-trapped area: 17.39% (95% CI: 05.44% - 34.95%)

Chick survival in the trapped area was significantly greater than in the non-trapped area (p=0.03)

- Sub-adult survival for 6 months to 1 year: 88.89% (95% CI: 62.42% - 97.10%), for 1 to 2 years: 87.05% (95% CI: 57.33% - 96.60%)
- Sub-adult survival for 2-3 years and 3-4 years is assumed to be the same as that for adult survival
- Annual adult survival: 96.21% (95% CI: 93.17% - 98.36%) and life expectancy of 26 (95% CI: 15-61) years. Another chance adult death would have reduced life expectancy by 11%, thus a sample size of 211 bird-years tracked provides a reasonably good estimate of adult survival.

### ***3.3 Stoat Trapping***

A total of 2706 stoats have been captured from winter 2002 to September 2012 in the Murchison Mountains Special Area.

## **4. Discussion**

The tokoeka chick recruitment study from 2003-2009 and the ensuing adult and sub-adult survival monitoring from 2009-2011 in the Murchison Mountains Special Area have been instrumental in gaining robust population modelling for northern Fiordland Tokoeka.

The investigation of kiwi productivity has shown a high productivity rate in terms of eggs per adult, but a relatively low hatch rate. The reason for this is unknown, however issues such as inbreeding and/or an ageing population may have an impact on hatch rates. The investigation of chick survival has shown a significant difference between the survival of chicks in the trapped area compared to the non-trapped area, in a non stoat plague year suggesting that this level of stoat control in the Murchison Mountains does protect kiwi chicks, in a non plague year. The population experiences 0% chick survival in occasional years due to stoat plagues from beech mast events therefore is reliant on decent chick survival in inter-mast seasons to offset this.

The population density of kiwi in the Murchison Mountains has been estimated at around 700 productive pairs, by extrapolating the known territory across the entire area combined with the known rate of productivity (70%).

The results for the additional aims of the project indicate high adult and sub-adult survival, with an average life expectancy of 26 years. While lower than at Tongariro, (30 years recorded and expectancy of up to 50

years), and higher than at Northland (13 years, due to dog kills), it is logical given the extreme nature of the Murchison Mountains, where kiwi and takahe often fall victim to avalanches, rock-fall or drowning. The average life expectancy of takahe in the Murchison Mountains is only 14 years (Jane Maxwell, pers.comm.).

The predicted rate of increase of the kiwi population under the current stoat control regime is 1.07% per annum, in a non-plague year. This trend is likely to increase as a result of the increase in stoat trapping intensity.

## 5. Recommendations

The challenge now and into the future is to develop a well designed monitoring system with enough resolution to capture the population trend of northern Fiordland tokoeka in the Murchison Mountains Special Area in response to predator management.

## 6. Acknowledgements

Thank-you to: the Bank of New Zealand Save the Kiwi Trust, Kirra Tours and the Columbus Zoo Conservation Trust for crucial funding of these projects. Thank-you to: Ngai Tahu for their support and involvement. Thank-you to Jane Tansell for her tireless passion and commitment over the duration of this project.

Thanks also to those in the Department who have given advice and assistance: the Takahe team, the Kiwi Recovery Group, Hugh Robertson, Ian Westbrooke, James Reardon, Megan Willans, Michelle Gutsell and others. Thanks to all those who helped on the ground over the years. Thanks also to Fiordland Helicopters and Real Journeys for reliable transport.

## 7. References

Tansell, J (2010a) *Tokoeka chick recruitment study 2003 to 2009*. Department of Conservation Internal Report (DOC DM-463106)

Tansell, J (2010b) *Tokoeka monitoring, Murchison Mountains, 2009/10*. Department of Conservation Internal Report

Tansell, J; Edmonds, H (2011) *Tokoeka monitoring, Murchison Mountains, 2010/11*. Department of Conservation Internal Report (DOC DM-1032022)



Edmonds, H (2005). *Fiordland Tokoeka Productivity and Chick Survival Study, Clinton Valley, Fiordland National Park 2004/2005*. Department of Conservation Internal Report.