Response of Sub-adult North Island Brown Kiwi to Relocation from Captivity to the Wild.

A thesis presented in partial fulfillment of the requirements for the degree of Master of Science in Ecology at Massey University, Palmerston North, New Zealand/Aotearoa.

Anna Rhys Grant
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Abstract

Brown kiwi (Apteryx mantelli) juveniles are raised in captivity and released into the wild as sub-adults due to an extremely high mortality rate of young kiwi in mainland habitats where adequate stoat control cannot be achieved. This management technique is known as Operation Nest Egg (ONE). This thesis research investigated aspects of the behaviour of ONE kiwi both before and after release. The aim was to identify factors influencing activity patterns and dispersal in captive-reared sub-adult kiwi released into the wild, and how these influence survivorship and vigour.

Behavioural responses to relocation and release were examined by comparing kiwi’s nightly activity levels before release with those after release. Activity was quantified using motion sensitive transmitters. Observations of kiwi and simultaneous collection of data from the kiwi’s transmitter showed that the signal pattern from the transmitters could be used to distinguish kiwi’s inactive and active periods with a high degree of reliability. Furthermore, continuous walking or running could be distinguished from other activity such as foraging with moderate reliability when the signal from only one kiwi was recorded continuously.

On the first night after relocation and release into the wild kiwi tended to have unusual and low activity patterns relative to other nights after release. This may have been a result of stress associated with the transportation and release. After their first night in the wild kiwi exhibited higher levels of activity than had been recorded before release. It was hypothesised that this increase in activity was a response to a lower rate of energy intake in the wild than in captivity. In support of this hypothesis, activity of captive kiwi increased when prepared food was distributed in many portions around the enclosure relative to when it was provided in one portion. Support is tentative however, because the sample size was small.

Data on the kiwi’s daytime locations were collected for up to two years after release. Almost all of the sub-adult kiwi showed dispersal from their release site. Kiwi released in areas lacking resident kiwi tended to disperse further than those released into an area with
several resident kiwi near their release sites. The different dispersal tendencies among areas could be a result of conspecific attraction but firm conclusions were prevented due to some confounding among variables. Kiwi that were later depredated dispersed further than kiwi not preyed on. This relationship may be due to far-dispersing individuals having low site familiarity or a high likelihood of encountering habitat edges and their associated predators.

All kiwi lost weight after release and many did not recover to their pre-release weights for several months after release. There was an almost significant positive correlation between level of pre- to post-release activity increase and weight loss after release. No relationship between level of activity suppression on the first night in the wild and post-release weight loss was detected. However, small sample sizes in the activity studies made it difficult to draw definite conclusions about the impact activity changes had on the kiwi’s post-release vigour. No relationship between dispersal distances and weight change after release was detected.

It was suggested that activity change after release might be minimised by releasing kiwi at times when their activity in captivity is naturally higher and by providing a dispersed feeding regime prior to release. It was also recommended that kiwi be released near resident kiwi if possible, provided that aggression from the adults towards newly released kiwi is unlikely.
Acknowledgements

A huge thank you to all the volunteers who willingly and sometimes even gladly spent hours awake in the middle of the night in a tent listening to beeps. There’s a large part of this thesis that would not have been possible without your help. So (I hope I don’t forget anyone) thanks to Kate, Lindsey, Pete, Matt, Tammy, Tio, Bernadette, Robyn, Tamsin, Rachel, Claire, Merline, Mike, Andre and Hannalee. Thank you for usually managing to stay awake for the two hour or so shifts in the middle of the night, and for your company, sharing of cooking skills and enthusiasm.

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For Putiputi – may you be the first of many,

Contents

Abstract ii
Acknowledgements iv
List of figures xi
List of tables xiii
Note on data used in this thesis xv

Chapter 1 Introduction 1
  1.1 The kiwi 1
  1.2 History of kiwi decline 4
  1.3 Kiwi Recovery Programme 7
  1.4 Operation Nest Egg 9
  1.5 Captive rearing and relocation as conservation management tools 11
  1.6 Objectives of this study 13
      Aim of this thesis 13
      Thesis layout 14
  1.7 Study sites and subjects 14
      Study sites 14
      Kiwi studied 22
      Release procedure 22
  1.8 References 26

Chapter 2 Quantifying activity in kiwi 32
  2.1 Introduction 32
  2.2 Methods 35
      Phase 1 36
Contents (cont.)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td>39</td>
</tr>
<tr>
<td>Phase 3</td>
<td>42</td>
</tr>
<tr>
<td>Phase 4</td>
<td>42</td>
</tr>
<tr>
<td>Downloading, processing and analysis of data</td>
<td>43</td>
</tr>
<tr>
<td><strong>2.3 Results</strong></td>
<td></td>
</tr>
<tr>
<td>General observations of kiwi movement and changes in signal mode</td>
<td>45</td>
</tr>
<tr>
<td>Conversion of automated data to a format comparable with manual data</td>
<td>46</td>
</tr>
<tr>
<td>Relationship of activity transmitter signal pattern with observed behaviour</td>
<td>47</td>
</tr>
<tr>
<td>System for classifying behaviour into groups based on activity transmitter data</td>
<td>51</td>
</tr>
<tr>
<td>Correlation of two methods for quantifying activity transmitter signal pattern</td>
<td>54</td>
</tr>
<tr>
<td><strong>2.4 Discussion</strong></td>
<td>59</td>
</tr>
<tr>
<td><strong>2.5 References</strong></td>
<td>65</td>
</tr>
</tbody>
</table>

**Chapter 3**  
Kiwi activity before and after relocation and release into the wild  

**3.1 Introduction**  

**3.2 Methods**  
Pre-release monitoring  
Post-release monitoring  
Data processing and analysis  

**3.3 Results**  
Relationship between foraging time and total activity time  
Variables affecting pre-release activity  

References  
Kiwi activity before and after relocation and release into the wild  
Introduction  
Methods  
Pre-release monitoring  
Post-release monitoring  
Data processing and analysis  
Results  
Relationship between foraging time and total activity time  
Variables affecting pre-release activity  
References
**Contents (cont.)**

<table>
<thead>
<tr>
<th>Post-release activity</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre- and post-release activity of individual kiwi</td>
<td>78</td>
</tr>
<tr>
<td>Variables affecting pre- and post-release activity</td>
<td>81</td>
</tr>
<tr>
<td>Mean nightly activity pre- and post-release</td>
<td>85</td>
</tr>
</tbody>
</table>

3.4 Discussion 89

3.5 References 94

**Chapter 4**  
**Effect of food provisioning regime on activity of captive kiwi**  
4.1 Introduction 99

4.2 Methods 100
   - Data collection 101
   - Experimental procedure 102
   - Data processing and analysis 102

4.3 Results 104
   - Effect of treatment on activity 104
   - Weight gains and food intake 105
   - Mean activity when food distributed 105

4.4 Discussion 107

4.5 References 108

**Chapter 5**  
**Post-release movements of captive-reared sub-adult kiwi**  
5.1 Introduction 111

5.2 Methods 113
   - Data analysis 114

5.3 Results 116
   - Movement patterns of individual kiwi 116
Contents (cont.)

Factors correlated with dispersal 116

Median distances moved from release sites 122

5.4 Discussion 124
5.5 References 128

Chapter 6 Implications and summary 134
6.1 Introduction 134
6.2 Post-release weight changes and their relationship to activity and distance moved 134
6.3 Summary of findings 138
6.4 Further research 139
6.5 Management recommendations 141
   Summary of recommendations 144
6.6 References 145

Appendices (on CD)
Appendix 1 Manual activity data recording sheet
Appendix 2 Analysis of variance on seconds active during different observed behaviours (60-second automated data)
Appendix 3 Analysis of variance on seconds active during three observed behaviour classes (60-second automated data)
Appendix 4 Analysis of variance on seconds active during different observed behaviours (15-second automated data)
Appendix 5 Analysis of variance on seconds active during three observed behaviour classes (15-second automated data)
Appendix 6 Analysis of variance on natural log of minimum lengths of active signal bouts during three observed behaviour classes
Contents (cont.)

Appendix 7 Analysis of variance on natural log of minimum lengths of inactive signal bouts during three observed behaviour classes

Appendix 8 Chi-square tables comparing different subsets of the data on their correct identification of behaviour

Appendix 9 Mixed model on minutes of activity pre-release
   Mixed model on minutes of activity post-release
   Mixed model on minutes of activity pre- and post-release

Appendix 10 Mixed model on minutes of activity relative to experimental group and timeperiod
   Mixed model on minutes of activity relative to experimental group and timeperiod

Appendix 11 Mixed model on distance moved from release site: using all terms
   Mixed model on distance moved from release site: after stepwise removal of least significant terms

Appendix 12 Weight changes of Tongariro kiwi after release
   Calculation of average daily weight loss after release, of the seven kiwi that were monitored before and after release

List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Current distribution of kiwi species.</td>
<td>2</td>
</tr>
<tr>
<td>1.2</td>
<td>Location of study sites.</td>
<td>15</td>
</tr>
<tr>
<td>1.3</td>
<td>Map of Tongariro Forest Conservation Area.</td>
<td>17</td>
</tr>
<tr>
<td>1.4</td>
<td>Map of Karioi Rahui.</td>
<td>20</td>
</tr>
<tr>
<td>2.1</td>
<td>Plan of kiwi enclosure area (phase 1).</td>
<td>37</td>
</tr>
<tr>
<td>2.2</td>
<td>Plan of kiwi enclosure area (phases 2 and 4).</td>
<td>40</td>
</tr>
<tr>
<td>2.3</td>
<td>Frequency graphs relating seconds active to number of pulses recorded by data logger.</td>
<td>48</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>Seconds active/60 data untransformed, and smoothed with a moving average of five minutes.</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>Correlation of manual and automated data recording methods in quantifying seconds active out of 5 minutes.</td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Energy budget model.</td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>Nightly foraging time relative to nightly total activity time, (a) pre-release and (b) post-release.</td>
<td></td>
</tr>
<tr>
<td>3.3</td>
<td>Unadjusted regression of pre-release activity against rainfall.</td>
<td></td>
</tr>
<tr>
<td>3.4</td>
<td>Least squared means of kiwi pre-release nightly activity times during different moon phases.</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>Timeline of nightly activity levels of each kiwi pre- and post-release.</td>
<td></td>
</tr>
<tr>
<td>3.6</td>
<td>Least squared means of kiwi nightly activity at different times relative to release.</td>
<td></td>
</tr>
<tr>
<td>3.7</td>
<td>Least squared means of kiwi pre-release and post-release (excluding night 1) nightly activity times.</td>
<td></td>
</tr>
<tr>
<td>3.8</td>
<td>Least squared means of nightly minutes active pre and post-release during different months.</td>
<td></td>
</tr>
<tr>
<td>3.9</td>
<td>Unadjusted regression of activity against night length (a) pre-release and (b) post-release.</td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>Least squared mean of nightly minutes active by control and treatment kiwi during the pre-treatment and treatment periods.</td>
<td></td>
</tr>
<tr>
<td>4.2(a)</td>
<td>Average daily weight gain of each kiwi, during four consecutive time periods.</td>
<td></td>
</tr>
<tr>
<td>4.2(b)</td>
<td>Least squared mean of prepared food consumed each night by treatment and control kiwi during three time periods before during and after the treatment period.</td>
<td></td>
</tr>
<tr>
<td>5.1(a)</td>
<td>Distance of each kiwi from their release site over time since release.</td>
<td></td>
</tr>
<tr>
<td>5.1(b)</td>
<td>Distance from release site over time, of each kiwi still being monitored 36 weeks after release.</td>
<td></td>
</tr>
</tbody>
</table>
List of Figures (cont.)

5.1(c) Distance from release site over time of kiwi not monitored beyond 32 weeks post-release. 
5.2 Least squared means of kiwi distance from release site over time since release, in the three release areas. 
5.3 Least squared means of distance from release site during each month of the year in the three release areas. 
5.4 Least squared means of (a) female and (b) male distance from release site during each month of the year, in the three release areas. 
5.5 Least squared means of distance from release site over time since release of kiwi that were eventually preyed on vs those who were not preyed on. 
6.1 Post-release activity increase versus post-release average daily weight loss. 
6.2 Activity on first night in the wild as proportion of subsequent activity versus post-release average daily weight loss. 
6.3(a) Weight change since release versus distance from release site in the second month after release. 
6.3(b) Weight change since release versus distance from release site in the third month after release. 
6.3(c) Weight change since release versus distance from release site in the fourth month after release. 

List of Tables

1.1 Individual kiwi used in this thesis. 
1.2 Mean ages of kiwi released into East and West TFCA and Karioi Rahui. 
2.1 Example of automated data after downloading, importing into excel, and deleting unnecessary columns.
List of Tables (cont.)

2.2  Ethogram of behaviours observed in captive kiwi.  
     Page 41

2.3  Example of automated data (collected in 15 second periods) 
     after sorting by individual, conversion to seconds active/60 and 
     entering the observed behaviour corresponding to each minute.  
     Page 43

2.4  Example of automated data (collected in 60 second periods) 
     after conversion to seconds active/60, entering seconds 
     active/60 from the corresponding manual data, and entering 
     the observed behaviour.  
     Page 44

2.5  Conversion of pulse numbers per data logger scan to seconds 
     active per time period.  
     Page 49

2.6  Mean number of seconds active out of 60 (derived from 
     automated data collected in 60 second periods) during 
     specific observed behaviours.  
     Page 51

2.7  Mean number of seconds active out of 60 (derived from 
     automated data collected in 60 second periods) during 
     observation of three behaviour classes.  
     Page 51

2.8  Mean number of seconds active out of 60 (derived from 
     automated data collected in 15 second periods) during 
     specific observed behaviours.  
     Page 52

2.9  Mean number of seconds active out of 60 (derived from 
     automated data collected in 15 second periods) during 
     observation of three behaviour classes.  
     Page 52

2.10 Mean minimum lengths of single bouts of transmitter (a) 
     activity and (b) inactivity, while kiwi observed to be in 
     different behaviours.  
     Page 53

2.11 Percentage of observations classified correctly as inactive or 
     active.  
     Page 56

2.12 Percentage of observations classified correctly as behaviour 
     class 0, 1, or 2 for five individuals from automated data, with 
     classification criteria: class 0 < 26.42 ≤ class 1 ≤ 54.6 < class 2.  
     Page 57

2.13 Percentage of observations classified correctly as behaviour 
     class 0, 1, or 2, from (a) automated data collected in 15-second 
     periods and (b) manual data, with classification criteria: 
     class 0 < 26.42 ≤ class 1 ≤ 56.64 < class 2.  
     Page 58

3.1  Likelihood statistics of factors relating to kiwi pre-release 
     nightly activity.  
     Page 79
List of Tables (cont.)

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>Likelihood statistics of factors relating to kiwi activity after release.</td>
<td>80</td>
</tr>
<tr>
<td>3.3</td>
<td>Comparisons between pre- and post-release activity in individual kiwi.</td>
<td>84</td>
</tr>
<tr>
<td>3.4</td>
<td>Comparisons between pre- and post-release activity variance in individual kiwi.</td>
<td>85</td>
</tr>
<tr>
<td>3.5</td>
<td>Likelihood statistics of factors relating to kiwi activity before and after release.</td>
<td>86</td>
</tr>
<tr>
<td>4.1</td>
<td>Design of experiment testing effect of food provisioning regime on kiwi activity.</td>
<td>103</td>
</tr>
<tr>
<td>5.1</td>
<td>Likelihood statistics of factors relating to kiwi distance from release site.</td>
<td>120</td>
</tr>
</tbody>
</table>

Note on Data Used in this Thesis

Some of the data used in this thesis were collected specifically for the thesis and some data were being collected already as part of the Tongariro Kiwi Protection Project. Data used in Chapters 2 and 3 were collected specifically for this thesis. For Chapter 4, the experimental procedure and collection of activity data were carried out specifically for this thesis but weight and food intake data were collected by Rainbow Springs staff as part of routine management. Location data used in Chapter 5 and weight data used in Chapter 6 were collected over five and a half years from January 1997 till August 2002, by Department of Conservation staff at Whakapapa (and Rainbow Springs staff who collected the final pre-release weights) as part of the Tongariro Kiwi Protection Project. For three of these years (October 1997 till February 1998 and November 1998 till April 2001), I was one of these Department of Conservation staff and during this time I collected a large portion of the data on location and weights of the sub-adult kiwi.