

Before an Independent Hearing Commissioner at Hurunui District Council

*under:* the Resource Management Act 1991

*in the matter of:* application RC210098 for land use consent to install  
and operate a Gravity-Based Recreation Activity within  
the Conical Hill Reserve, Hanmer Springs

*between:* **Hanmer Springs Thermal Pools & Spa**  
*Applicant*

*and:* **Hurunui District Council**  
*Consent Authority*

Statement of Evidence of Mandy D Tocher

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Dated: 23 September 2021

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## **STATEMENT OF EVIDENCE OF MANDY D TOCHER**

### **INTRODUCTION**

- 1 My name is Mandy D Tocher.
- 2 I currently hold the position of Principal Herpetologist for LizardExpertNZ, having very recently moved from a position of Principal Ecologist for Ryder Environmental, Dunedin. Prior to taking up my position with Ryder Environmental in October 2017, I was employed by another Ecological Consultancy from 2011 as a Senior Ecologist. From 1996-2011 (16-years) I was employed by head office of the Department of Conservation as a research scientist specialising in the conservation management of South Island lizards and frogs, including carrying out and publishing research across multiple South Island sites.
- 3 I hold a Ph.D. from the University of Canterbury awarded in 1997, where I researched the effects of forest fragmentation, forest destruction, edge effects, and matrix habitat on herpetofauna using grant money awarded from the Smithsonian Institute in Washington, USA and the World Wildlife Fund (US). This work culminated in the publication of multiple book chapters and scientific publications.
- 4 I also hold a Master of Science (1st class honours in Zoology), awarded from the University of Canterbury in 1992. For my Master of Science, I also completed a post-graduate paper in Ornithology and my undergraduate degree (Bachelor of Science), also awarded from the University of Canterbury, had a strong emphasis on New Zealand natural sciences.
- 5 I also hold a master's degree in planning (Distinction), awarded from the University of Otago in 2017. This degree was supported by a scholarship from the Resource Management Law Association. As part of this degree, I researched Section 6 (c) of the RMA (1991), and how the second clause relating to habitats of indigenous fauna was applied in current practice over Otago and Southland district and regional councils.
- 6 I am an author of book chapters, scientific and popular articles on New Zealand native lizards and frogs, including recovery plans for nationally threatened species. I have also written multiple best practice manuals, technical guidance documents and strategic plans. I very recently authored a reptile chapter for the second edition of Sir Alan Marks seminal New Zealand Alpine Book named "Above the Treeline: A Nature Guide to the New Zealand Mountains" that includes a chapter on alpine birds including kārearea/falcon.
- 7 I am a member of the New Zealand Amphibian Specialist Group for the IUCN, the New Zealand Reintroduction Specialist Group and a past

member of the DOC Herpetofauna Advisory Group, the Native Frog Recovery group and the Resource Management Law Association. I am a member of the New Zealand Planning Institute, and since 2018 have been an Associate Editor for the New Zealand Journal of Zoology.

- 8 As part of my DOC role, and as an Ecological Consultant until 2020, I sat on multiple New Zealand Threat Classification System expert panels (reptiles and frogs) and am therefore very familiar with the process with which eastern kārearea/falcon has been assessed by DOC as At Risk - Recovering<sup>1</sup>. I am a former member of the DOC reptile threat ranking panel and co-author of the most recent national threat ranking lists for reptiles.
- 9 As part of my role as Senior Ecologist from 2011-2017, I conducted two Forest Stewardship Council ecology audits for two major forestry companies, including a large company with forestry blocks in the Hurunui District, adjacent to Te Tihi o Rauheia/Conical Hill. As part of this role I became familiar with the widespread use of forestry areas by kārearea/New Zealand falcon in the Hurunui District, and best-practice methods employed by foresters to avoid adverse effects on falcon during forestry operations (e.g., see Appendix 1).
- 10 In preparing my evidence I have studied documents relevant to the Flyride Project Resource Consent application, including:
- The RMA Section 42A Officer's report dated 16 September 2021.
  - Public submissions lodged on the Hurunui District Council website that relate to avifauna.
  - The Te Tihi o Rauheia, Conical Hill Reserve Switchback Project Lizard Management Plan, dated 3 May 2021 (attached to this evidence as Appendix 2).
  - The Conical Hill Reserve Plan.
  - The Conical Hill Reserve Forest management programme 2012-2022.
  - New Zealand Falcon Management Guide Plantation Forestry: Best-practice forestry guidelines.
- 11 In addition, I have viewed and collated kārearea/New Zealand falcon records from Te Tihi o Rauheia, Conical Hill Reserve and surrounding forestry sites from eBird<sup>2</sup> and iNaturalist<sup>3</sup>.

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<sup>1</sup> Robertson, H.A.; Baird, K.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Miskelly, C.M.; McArthur, N.; O'Donnell, C.F.J.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2017: Conservation status of New Zealand birds, 2016. New Zealand Threat Classification Series 19. Wellington, Department of Conservation.

<sup>2</sup> <https://eBird.org>

<sup>3</sup> <https://inaturalist.nz/>

### **CODE OF CONDUCT**

- 12 Although these proceedings are not before the Environment Court, I have read the Environment Court's Code of Conduct for Expert Witnesses in its Environment Court Practice Note 2014 and I agree to comply with it as if these proceedings were before the Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

### **SCOPE OF EVIDENCE**

- 13 My evidence will deal with the following:
- 13.1 Conservation status of eastern kārearea/falcon.
  - 13.2 Background and sightings of kārearea/falcon over Te Tihi o Rauheia/Conical Hill.
  - 13.3 Actual and potential effects (including adverse and positive effects) of the Flyride project construction and operation on eastern kārearea/ falcon.
  - 13.4 Planned eastern kārearea/falcon management during the construction and operation of the Flyride.

### **SUMMARY OF EVIDENCE**

- 14 The eastern kārearea/falcon is classified as At Risk – Recovering by the Department of Conservation. Sightings of this species are common and frequent over the Hanmer Basin, including Conical Hill.
- 15 Ecological surveys that I undertook for the Applicant in January 2021, and again in April 2021, included searches for eastern kārearea/falcon, as well as other avian/fauna species. I failed to detect this species but based on sighting data to hand, I am confident Te Tihi o Rauheia/Conical Hill is used for foraging and perching (and maybe courting), but not nesting.
- 16 I believe that very few eastern kārearea/falcons will be affected by the Flyride project. Due to their strongly territorial nature, I hold the view that at most a single pair of eastern kārearea/falcon (and seasonally, their juveniles) frequent Te Tihi o Rauheia/Conical Hill and could be exposed to the Flyride.
- 17 Moreover, I could find no evidence of nesting having occurred within the Conical Hill Reserve in recent time, that includes the Flyride footprint, meaning eastern kārearea/falcon only use the reserve from

time to time and for behaviours that eastern kārearea/falcon are known to adapt to changing circumstances.

- 18 The construction and ongoing operation of the Flyride may, however, cause a mix of adverse and positive effects for eastern kārearea/falcon. In my opinion, of the potential and actual adverse effects I have identified only two require management: disturbance of scrapes/nest sites and breeding pairs, and collisions with Flyride passengers/infrastructure.
- 19 Although I believe nesting is unlikely to occur on Te Tihi o Rauheia/Conical Hill, the potential effects of the Flyride construction and operation on breeding pairs and nests can be effectively managed by adopting best-practice protocols derived largely from the New Zealand Falcon Management Guide Plantation Forestry: Best-practice forestry guidelines, and from DOC favoured guidelines. I provide a set of recommendations aligned with the forestry/DOC guidelines but expanded to suit the Te Tihi o Rauheia/Conical Hill context.
- 20 For collisions, I could find no evidence that cables/Flyride infrastructure pose a collision risk to eastern kārearea/falcon, justifying my recommendation for an adaptive management approach to collision management.
- 21 Lastly, I believe the potential positive effects for eastern kārearea/falcon from planned pest management over Te Tihi o Rauheia/Conical Hill will partially offset some potential adverse effects, such as displacement from foraging habitat and loss of perch trees.

### **CONSERVATION STATUS OF EASTERN KĀREAREA/FALCON**

- 22 According to the Department of Conservation (DOC<sup>4</sup>), kārearea/New Zealand falcon are formally recognised as two sub-species: *Falco novaeseelandiae ferox* (bush falcon) and *Falco novaeseelandiae novaeseelandiae* (eastern falcon).<sup>5</sup> The eastern kārearea/falcon is the sub species that occurs in the South Island including in and around Te Tihi o Rauheia/Conical Hill.
- 23 Eastern kārearea/falcon are a toanga species by Ngāi Tahu and the Ngāi Tahu 2025 vision document 2006<sup>6</sup> states a desire to protect all taonga tuku iho (treasures of the past).

<sup>4</sup> Robertson, H.A.; Baird, K.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Miskelly, C.M.; McArthur, N.; O'Donnell, C.F.J.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2017: Conservation status of New Zealand birds, 2016. New Zealand Threat Classification Series 19. Wellington, Department of Conservation.

<sup>5</sup> Trewick S.A. and Olley L. 2016: Spatial size dimorphism in New Zealand's last endemic raptor, the Kārearea *Falco novaeseelandiae*, coincides with a narrow sea strait. *Ibis* 158: 747–761.

<sup>6</sup> [https://ngaitahu.iwi.nz/wp-content/uploads/2013/06/NgaiTahu\\_2025.pdf](https://ngaitahu.iwi.nz/wp-content/uploads/2013/06/NgaiTahu_2025.pdf)

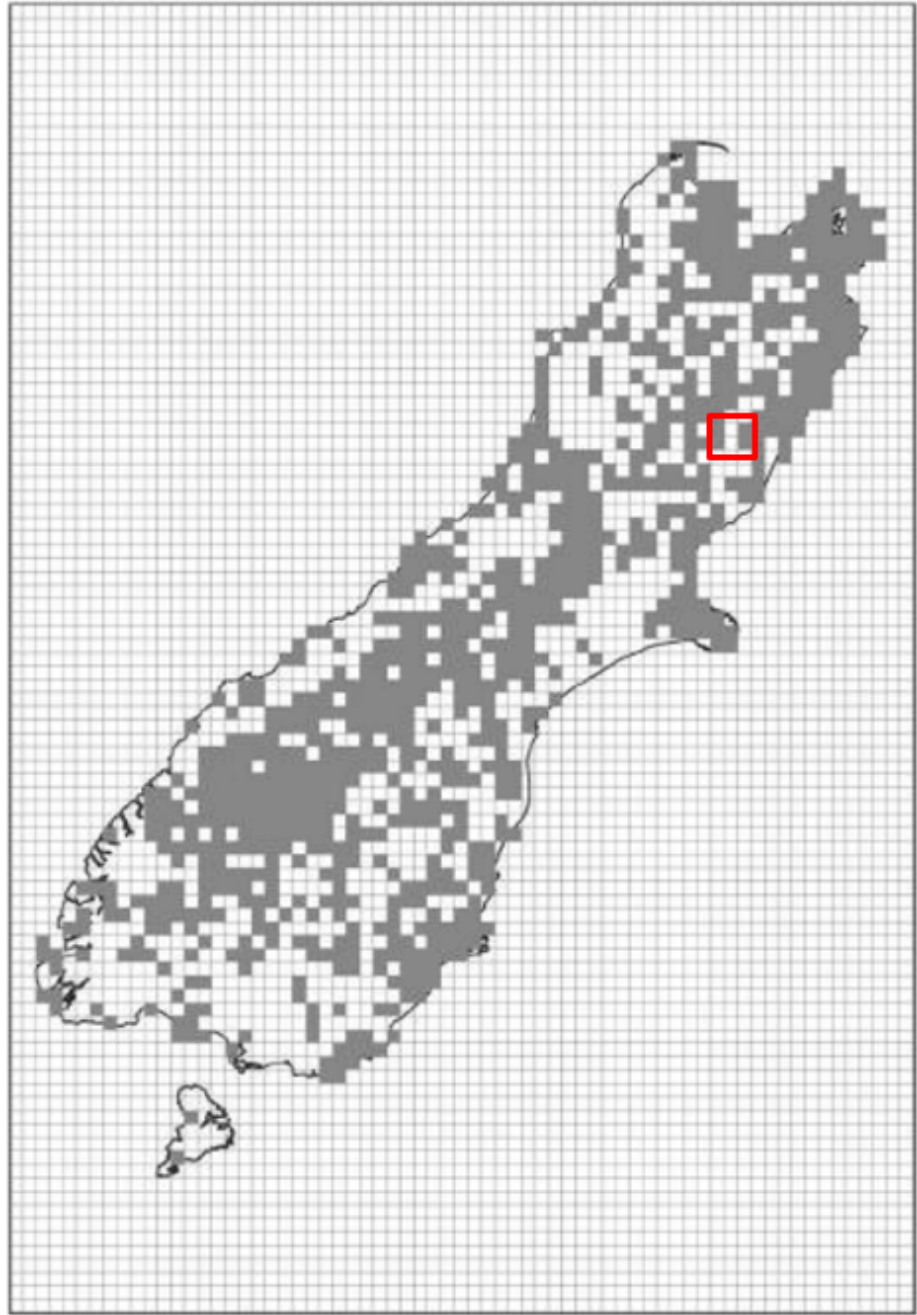
- 24 In the most recent DOC threat classification assessment, the eastern kārearea/falcon has been classified as At Risk – Recovering, with a “data poor” qualifier and an estimated nation-wide population size of 1000–5000 mature individuals.
- 25 DOC considers that taxa classified as At Risk - Recovering are those that have undergone a documented decline within the last 1000 years and now have an ongoing or predicted increase of >10% in the total population (or area of occupancy), taken over the next 10 years or three generations, whichever is longer<sup>7</sup>.
- 26 Although DOC is of the view that the South Island population of eastern kārearea/falcon is increasing; I note that there is an acknowledged degree of uncertainty around this, hence the “data poor” qualifier assigned to the classification.
- 27 Commonly documented threats to kārearea/falcon that may affect future population increases include predation (especially eggs and chicks in favoured ground or near-ground scrapes/nests), habitat loss, degradation and/or disturbance, electrocution, poisoning, shooting and vehicle/window collision. Collision with a deer fence has also been reported on one occasion in Otago<sup>8</sup>. I believe drone strike is a likely growing concern for nesting kārearea/falcon, who are reputed to attack drones fast and with much vigour once sighted in the vicinity of scrapes/nest sites near and within forestry plantations.
- 28 Despite the myriad of threats currently faced by eastern kārearea/falcon, a recovering population is broadly consistent with published results of a 10-year survey of national sightings that confirmed the widespread presence of eastern kārearea/falcon over the South Island,<sup>9</sup> including the Hurunui District (Figure 1).

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<sup>7</sup> Andrew J. Townsend, Peter J. de Lange, Clinton A.J. Duffy, Colin M. Miskelly, Janice Molloy and David A. Norton 2008. New Zealand Threat Classification System manual, Department of Conservation.

<sup>8</sup> Waite, E. 2017. Causes of mortality for kārearea/New Zealand falcon (*Falco novaeseelandiae*) in the Whakatipu district. *Notornis*, 64, 21-23.

<sup>9</sup> Bell, D. 2017. Distribution of New Zealand falcon (*Falco novaeseelandiae*): Results of a 10-year survey 2006-2016.



**Figure 1:** Distribution kārearea/falcon records across the South Island from Bell, D. 2017. Shaded squares indicate the confirmed presence of falcons. Each grid square encloses an area of 10 km<sup>2</sup>. The red square takes in Te Tahi o Rauheua/Conical Hill. This figure has been reproduced from Bell (2017) without the permission of the author.

## **BACKGROUND AND SIGHTINGS OF EASTERN KĀREAREA/ FALCON OVER TE TIHI O RAUHEA/CONICAL HILL**

- 29 Te Tihi o Rauheha/Conical Hill, a Recreation Reserve, is situated within the Miromiro Ecological District, a district renowned for its population of eastern kārearea/falcon<sup>10</sup> (Figure 1).
- 30 The two management plans relating to Te Tihi o Rauheha/Conical Hill contain goals/directives that do not directly refer to this species. The statutory Reserve Management Plan for Conical Hill<sup>11</sup> does not reference eastern kārearea/ falcon, or indeed any indigenous fauna species, but does promote weed and pest control that would indirectly benefit eastern kārearea/ falcon (see paragraphs 58-60 of this evidence for more detail on this). Similarly, the Conical Hill Reserve Forest Management Programme 2012-2022, referred to in the Reserve Management Plan for Conical Hill, has a goal to create a “near natural and pest free environment on Conical Hill”, with no explicit reference to eastern kārearea/ falcon.<sup>12</sup>
- 31 Despite management plans being silent on the presence and management direction for eastern kārearea/falcon, eBird and iNaturalist data indicate falcon are frequently sighted across the Hurunui District, including on Te Tihi o Rauheha/Conical Hill and adjacent Rayonier/Matariki plantation forestry.
- 32 I have summarised the documented sightings from the direct vicinity of Te Tihi o Rauheha/Conical Hill and the Flyride project footprint in Table 1. Sightings in and around Te Tihi o Rauheha/Conical Hill, based only on iNaturalist/eBird data, occur at less than 1 sighting per year (0.8 sightings per year between 2005-2021: Table 1).
- 33 I acknowledge, however, that many sightings of eastern kārearea/falcon in the vicinity and on Te Tihi o Rauheha/Conical Hill are undocumented, with many unlikely to be recorded in either iNaturalist or eBird. A case in point, a submission on the Flyride project from a resident on Oregon Heights (c. 115 m from the Flyride footprint) described sighting a breeding pair of eastern kārearea/falcon aerially passing food,<sup>13</sup> a behaviour that indicates chicks are being fed on a scrape (nest) somewhere in the vicinity, and up to c. 0.4 km away<sup>14</sup>.

<sup>10</sup> McEwan M. 1987. Ecological regions and districts of New Zealand. Department of Conservation.

<sup>11</sup> [https://www.hurunui.govt.nz/repository/libraries/id:23wyoavbi17q9ssstcjd/hierarchy/Infrastructure\\_Services/Property/Parks%20and%20Reserves/Reserves%20Management%20Plan/Hanmer-Springs-Ward-Reserves.pdf](https://www.hurunui.govt.nz/repository/libraries/id:23wyoavbi17q9ssstcjd/hierarchy/Infrastructure_Services/Property/Parks%20and%20Reserves/Reserves%20Management%20Plan/Hanmer-Springs-Ward-Reserves.pdf)

<sup>12</sup> Conical Hill Reserve Forest Management Programme 2012-2022.

<sup>13</sup> Submission by Celia Rodley.

<sup>14</sup> See <https://www.doc.govt.nz/nature/native-animals/birds/birds-a-z/nzfalcon-karearea/>



- 34 The same submitter reports observing “many times...over the years” eastern kārearea/falcon including witnessing a “shrieking call as it flies”, “watching a pair courting high in the air” and observing eastern kārearea/falcon “defending their ground nest under a fallen tree just above our house”.
- 35 The eastern kārearea/falcon sightings of the Oregon Heights submitter along with eBird and iNaturalist sightings in and around Hanmer Springs, indicate a healthy local breeding population of eastern kārearea/falcon exists.

**Table 1:** Thirteen eastern kārearea/falcon sightings (2005-2021) from iNaturalist and eBird in and around Te Tihi o Rauhea/Conical Hill. Note: all iNaturalist sightings were also recorded on eBird.

Date	Locality	Notes on Observation
<b>iNaturalist sightings</b>		
23/06/2021	Hanmer Springs	Perched on branch
26/07/2020	Hanmer Springs	2 sighted in township- perched
28/12/2018	Hanmer Springs	Perched
26/01/2013	Hanmer Springs Forest Camp	Flying ‘noisily’; a pair
<b>eBird sightings</b>		
23/06/2021	Hanmer Springs	Perched on branch (duplicate with iNaturalist sighting)
28/03/2021	Conical Hill	No data
19/12/2020	Summit of Conical Hill	No data
26/07/2020	Hanmer Springs	2 sighted in township- perched(duplicate with iNaturalist sighting)
28/12/2018	Hanmer Springs	Perched (duplicate with iNaturalist sighting)
11/12/2016	Flax Gully, Hanmer Springs	2 Adults dive-bombing people
22/08/2015	Pawsons Road, Hanmer Springs	Perched in tree
1/10/2013	Flax Gully track, Hanmer Springs	Pair dive-bombing
26/01/2013	Hanmer Springs Forest Camp	Flying ‘noisily’; a pair (duplicate with iNaturalist sighting)
07/03/2009	Pawsons Road, Hanmer Springs	Juvenile flying overhead
13/06/2008	Top of Conical Hill	Adult flew in calling landed on top of large pine
26/03/2006	Conical Hill	1 x sighted
06/04/2005	Conical Hill	Calling and aerial food pass observed

- 36 Given eastern kārearea/falcon are strongly territorial, with breeding pairs exclusively occupying and foraging over areas up to 15 km<sup>2</sup> in open country such as the Hanmer Basin, sightings of eastern kārearea/falcon on and in the vicinity of Te Tihi o Rauhea/Conical Hill

are likely to be of a single pair, and on occasion, juveniles from the pair.

- 37 Of relevance to the Flyride project, the limited number of sightings from Te Tihi o Rauheha/Conical Hill itself indicate the hill is used by eastern kārearea/falcon for foraging and perching, but sightings of eastern kārearea/falcon to hand do not provide substantive evidence of nesting having occurred on Te Tihi o Rauheha/Conical Hill in recent time (Table 1). Lack of evidence of nesting on Te Tihi o Rauheha/Conical Hill is a key finding, as disturbance during nesting has been shown to lead to 4 % of bush falcon nests failing in North Island plantation forests.<sup>15</sup>
- 38 Eastern kārearea/falcon tend to nest on or near the ground meaning eggs, chicks and attending parents are most vulnerable to predation by exotic mammals (cats, mustelids, hedgehogs, or rodents) during this phase of the life-cycle. In addition, breeding pairs are most aggressive when tending a scrape/nest, and so disturbing breeding pairs of eastern kārearea/falcon is not recommended in case disturbance leads to parents abandoning eggs or chicks.
- 39 Whilst conducting my own ecological surveys over Te Tihi o Rauheha/Conical Hill over January and then April, 2021, I was cognisant of the potential for eastern kārearea/ falcon to occur in the district and on Te Tihi o Rauheha/Conical Hill, and acknowledged this potential in my report.<sup>16</sup> To be clear, I undertook ecological surveys on behalf of the Applicant in January 2021, and again in April 2021, that included recording incidental observations of eastern kārearea/falcon, as well as other avian/fauna species.
- 40 Despite the known presence of eastern kārearea/falcon over Te Tihi o Rauheha/Conical Hill and my experience detecting this species, I did not observe this species nesting, perching, foraging, calling, swooping/dive-bombing or flying-over during seven field-days of ecological survey (34 hours by day and 8 hours by night).
- 41 I did, however, observe potential nesting habitat for eastern kārearea/falcon near the proposed Base/Stop station over the lower western face of Te Tihi o Rauheha/Conical Hill. Here, a clearing with a ground cover of jumbled felled branches and slash was created when the large, mature conifers were felled by Council for health and safety reasons in 2016.

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<sup>15</sup> Seaton, R., Holland, J. D., Minot, E. O., & Springett, B. P. (2009). Breeding success of New Zealand falcons (*Falco novaeseelandiae*) in a pine plantation. *New Zealand Journal of Ecology*, 32-39.

<sup>16</sup> Pages 11, 14 and 21 of: Tocher, M. 2021. Te Tihi o Rauheha, Conical Hill Reserve Switchback Project Lizard Management Plan, dated 3 May 2021. Attached to this evidence as Appendix 2.

- 42 Although similar cutover areas are favoured nesting sites for eastern kārearea/falcon in plantation forestry blocks, breeding pairs do not tend to construct scrapes/nests in areas with continuous human disturbance, preferring instead (in the case of pairs within forestry blocks) to move nesting locations within territories, depending on logging schedules.
- 43 The cutover area over the lower western face of Te Tihi o Rauheia/Conical Hill experiences a high-level of human foot traffic and associated noise disturbance. In my opinion, therefore, this cutover area is unlikely to have been selected as a suitable nesting site for eastern kārearea/falcon between 2016-2021, the period that the clearing has been present.
- 44 During my surveys, the lack of observations of aggressive eastern kārearea/falcon nest-defence behaviour increased my confidence that eastern kārearea/falcon were not nesting on Te Tihi o Rauheia/Conical Hill. When eastern kārearea/falcon have a scrape/nest nearby, one can be left in no doubt. Breeding pairs of eastern kārearea/falcon are exceptionally aggressive, and rank amongst the most aggressive falcons worldwide. They will make repeated and sustained attacks with contact with the head of a human-intruder within 50 m of a scrape/nest, typically raking the point of contact with out-stretched talons. No such defensive behaviour was observed during my surveys, despite one of the surveys (January) being conducted during the eastern kārearea/falcon nesting season.
- 45 Furthermore, I have found no documented reports of eastern kārearea/falcon attacks on Te Tihi o Rauheia/Conical Hill users or residents, attacks that would indicate nesting close by (within c. 15-50 m). I hold the view, therefore, that the areas of Te Tihi o Rauheia/Conical Hill accessible to the public have not been used for eastern kārearea/falcon nesting in recent time.
- 46 During my ecological surveys I did detect other bird species (both indigenous and exotic species), and have reported on these birds elsewhere, along with my observations of other fauna and flora species.<sup>17</sup>

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<sup>17</sup> See page 15, Table of bird sightings/detections of: Tocher, M. 2021. Te Tihi o Rauheia, Conical Hill Reserve Switchback Project Lizard Management Plan, dated 3 May 2021. Attached to this evidence as Appendix 2.

**ACTUAL AND POTENTIAL EFFECTS (INCLUDING ADVERSE AND POSITIVE EFFECTS) OF THE FLYRIDE PROJECT CONSTRUCTION AND OPERATION ON EASTERN KĀREAREA/FALCON**

- 47 It is anticipated the Flyride project could generate the following actual and potential effects on eastern kārearea/falcon of Te Tihi o Rauheia/Conical Hill during construction:
- 47.1 Noise and disturbance through increased vehicle and human traffic, earthworks, and the felling of large conifers that may cause temporary displacement from a small area of territory used for perching and foraging (and perhaps courtship), and/or affect the abundance and/or species composition of other Te Tihi o Rauheia/Conical Hill bird species that are used as prey by eastern kārearea/falcon.
  - 47.2 Noise and disturbance of breeding pairs and/or their scrape/nest site leading to abandonment of scrape and/or failure of existing scrape/nest.
  - 47.3 Habitat loss through the removal of large conifers that are used intermittently as perch trees for eastern kārearea/falcon.
- 48 It is anticipated that the Flyride project could generate the following actual and potential effects on eastern kārearea/falcon of Te Tihi o Rauheia/Conical Hill through ongoing operation:
- 48.1 Noise and disturbance through increased human foot traffic leading to and from the Top/Base stations, and within and adjacent to the Flyride passenger envelope, that could lead to either permanent or temporary displacement from a small area of territory used for perching and foraging, and/or affect the abundance and/or species composition of other Te Tihi o Rauheia/Conical Hill bird species that are used as prey by eastern kārearea/falcon.
  - 48.2 Injury/death through collision with Flyride passengers/cables.
  - 48.3 Improved prey abundance through sustained wasp control and other planned pest management over Te Tihi o Rauheia/Conical Hill.

**Noise & Disturbance Causing Displacement**

- 49 Noise and disturbance during construction and ongoing operation of the Flyride may discourage foraging and perching (and perhaps courtship) of eastern kārearea/falcon thus temporarily or even permanently displacing them from the area of disturbance on Te Tihi o Rauheia/Conical Hill, but not from their much larger territory.

- 50 I believe this effect will not prove significant, however, as research data for eastern kārearea/falcon in plantation forestry<sup>18</sup> indicates a high degree of site fidelity in pairs, despite forestry operations moving throughout territories. Birds have been shown to adjust to forage elsewhere within their territory, and even move scrape/nest sites in response to forestry operations within territories.
- 51 Likewise, although noise and disturbance during construction and operation could affect bird species that are used as prey by eastern kārearea/falcon, eastern kārearea/falcon are known to alter diet to match local prey abundance. In this way they are resilient and unlikely to be impacted should bird species move or change composition from the construction footprint either temporarily or permanently.
- 52 Notwithstanding my comments above, I estimate that at most a single pair of eastern kārearea/falcon (and seasonally, their juveniles) could be affected/displaced from foraging and perching grounds by noise/disturbance during construction and during the ongoing operation of the Flyride. This effect is considered to have a high likelihood of occurring but is not anticipated to have a significant effect on local eastern kārearea/falcon, and in my opinion, does not require mitigation.
- 53 Should eastern kārearea/falcon begin nesting on Te Tihi o Rauheha/Conical Hill, noise and disturbance during construction of the Flyride could adversely affect the breeding pair and/or their scrape/nest site leading to abandonment of scrape and/or failure of existing nest<sup>19</sup>.
- 54 As noted over paragraphs 37-45 of this evidence, I believe nesting has not occurred on Te Tihi o Rauheha/Conical Hill in recent time, but nevertheless I acknowledge nesting could occur over 2021/2022. The effect of noise and disturbance on a breeding/nesting pair is considered here to have a very low likelihood of occurring but could have a significant effect on local eastern kārearea/falcon if it did. This potential effect, therefore, requires mitigation; see paragraph 61 of this evidence.

### **Injury and/or Death Through Collisions**

- 55 In preparing this evidence, I have reviewed published research on eastern kārearea/falcon mortality, and in particular mortality or injury caused by collisions with cables/towers/chairlifts and the like. I was

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<sup>18</sup> Parker, G. 2017. Research to inform the management of Kārearea / NZ falcon in Eastern Otago. Parker Conservation, August 15<sup>th</sup>, 2017.

<sup>19</sup> Seaton, R., Holland, J. D., Minot, E. O., & Springett, B. P. (2009). Breeding success of New Zealand falcons (*Falco novaeseelandiae*) in a pine plantation. *New Zealand Journal of Ecology*, 32-39.

unable to find reports of any such collisions, although not all causes of mortality could be determined in some studies.<sup>20</sup> There were numerous reports of electrocution from power lines<sup>21</sup>, poisoning, shooting and vehicle/window collision. Collision with a deer fence was also reported on one occasion.

- 56 Given the speed and agility of eastern kārearea/falcon that allows them to catch other birds on the wing as prey, and the lack of documented records of collisions, I am confident that the potential effect of injury and/or death through collision with Flyride components has a low likelihood of occurring but could have a significant effect on local eastern kārearea/falcon if it did. This potential effect, therefore, requires some consideration/mitigation, and juvenile eastern kārearea/falcons with less flying experience may be more at risk; see paragraph 62-64 of this evidence.

### **Habitat Loss**

- 57 To construct the Flyride, some eastern kārearea/falcon perching habitat will be lost through the removal of large conifers. I consider that this effect has a moderate likelihood of occurring, in that the large number conifers present lessen the risk that a favoured perch tree is one of the trees scheduled for removal. If a perch tree (or trees) were removed, I consider this would not have a significant effect on local eastern kārearea/falcon population. This potential effect, therefore, does not require mitigation.

### **Positive Effect of Pest Management**

- 58 As part of the Applicants commitment to managing lizard populations of Te Tihi o Rauheia/Conical Hill, pest management is planned that will also potentially benefit the bird fauna of the hill, including eastern kārearea/falcon<sup>22</sup>. Sustained German wasp control, for example, may result in local increases in invertebrates and the birds that feed on them. Juvenile falcon have a relatively high invertebrate intake in their diet; and any increases in local bird populations will enhance eastern kārearea/falcon food supply.
- 59 Invertebrate and avian food supply for eastern kārearea/falcon may also benefit from rodent management planned on Te Tihi o Rauheia/Conical Hill. Rodent management will take the form of monitoring in the first instance, to inform decisions in the future and

<sup>20</sup> Waite, E. 2017. Causes of mortality for kārearea/New Zealand falcon (*Falco novaeseelandiae*) in the Whakatipu district. *Notornis*, 64, 21-23.

<sup>21</sup> I have been advised from the Applicant, that there is no electrocution risk to eastern kārearea/falcon from the Flyride (Ben Smith pers. comm. September 2021).

<sup>22</sup> Tocher, M. 2021. Te Tihi o Rauheia, Conical Hill Reserve Switchback Project Lizard Management Plan, dated 3 May 2021. Attached to this evidence as Appendix 2.

as required, regarding the need to carry out rodent control to better protect biodiversity.

- 60 I consider that the potential positive effects of planned pest management have a moderate likelihood of benefiting eastern kārearea/falcon and as such, can legitimately be used to partially offset actual and potential adverse effects detailed over paragraphs 47-48 of this evidence.

## **PLANNED MANAGEMENT OF EASTERN KĀREAREA/FALCON DURING CONSTRUCTION AND OPERATION OF THE FLYRIDE**

### **During Construction: Avoid Nests**

- 61 To avoid and minimise any actual and potential effects of the Flyride construction and operation on eastern kārearea/falcon breeding pairs and/or scrapes/nests, I recommend the following actions are undertaken by the Applicant:
- 61.1 Provide a verbal briefing to the on-the-ground head contractor/project manager on eastern kārearea/falcon breeding and nesting behaviour; and provide them with a copy of Appendix 1, New Zealand Falcon Management Guide Plantation Forestry: Best-practice forestry guidelines, and Appendix 3, falcon nest management guidelines favoured by DOC.
- 61.2 When drafting tender documents/contracts for Flyride construction activities, include a requirement to adhere to New Zealand Falcon Management Guide Plantation Forestry: Best-practice forestry guidelines (Appendix 1) and DOC favoured guidelines (Appendix 3<sup>23</sup>), and any other any conditions of consent relating to eastern kārearea/falcon to safeguard scrapes/nests.
- 61.3 Ahead of works undertaken between August to March, brief the on-the-ground project manager/contractors to walk-through work areas and remain vigilant, and to immediately report to Applicant, any eastern kārearea/falcon breeding activity. Explain that breeding eastern kārearea/falcon will swoop and dive-bomb people as they approach a scrape/nest, and these aggressive behaviours will escalate to physical contact when the intruder is within 50 m of a scrape/nest.
- 61.4 Should aggressive breeding/nesting behaviours be observed either before or during works, follow the guidelines provided in Appendix 1 (developed for forestry workers) and Appendix 3

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<sup>23</sup> Should there be inconsistency between guidelines in Appendix 1 and 3, guidelines favored by DOC in Appendix 3 should prevail.

(also developed for forestry and favoured by DOC), summarised here as follows:

- (a) If dive-bombing observed, or eggs found, or small white fluffy chicks/large grey chicks are found, planned works must withdraw 200 m for 75, 45, 20 days respectively.
- (b) If feathered chicks that cannot fly are found, planned works must withdraw 100 m for 15 days.
- (c) If young falcon that can fly are found, works can continue as planned.
- (d) If a nest cannot be located, planned works must withdraw 200 m from where nesting behaviour was observed (e.g., dive bombing).

#### **During Operation of the Flyride: Collisions**

- 62 I recommend an adaptive management approach is taken for the management of collisions by eastern kārearea/falcon into Flyride components. More specifically, all collisions and near misses must be reported to DOC, and if collisions occur at a frequency of 1 every 2-years, advice is then sought from an eastern kārearea/falcon expert on changes that could be made to operating and/or infrastructure to minimise and mitigate future collisions.
- 63 Should an injured eastern kārearea/falcon be found, the Applicant can consult [https://www.wingspan.co.nz/bird\\_of\\_prey\\_rehabilitation.html](https://www.wingspan.co.nz/bird_of_prey_rehabilitation.html) for advice on how to proceed, and how to contain the bird safely for transport (Guidance provided here as Appendix 4).
- 64 All sightings of eastern kārearea/falcon must be reported at <https://www.nzfalcon.org.nz/report-an-observation/> to improve the data on sightings locally.

#### **CONCLUSIONS**

- 65 Provided the forestry protocols are adhered to by the Applicant and contractors, adaptive management is applied to eastern kārearea/falcon collisions and planned pest management over Te Tihi o Rauheia/Conical Hill is effective, I am confident the Flyride project will not impact significantly on the local eastern kārearea/falcon population.



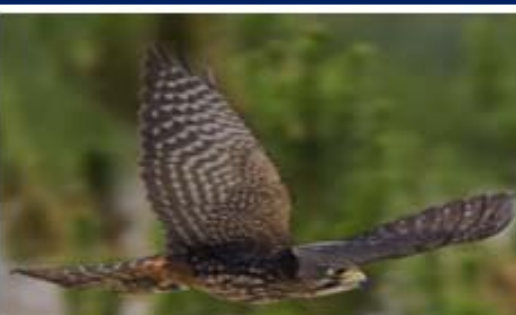
Dated: 23 September 2021

A handwritten signature in blue ink, appearing to read 'Mandy D Tocher', written in a cursive style.

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Mandy D Tocher

**Appendix 1:** New Zealand Falcon Management Guide Plantation Forestry: Best-practice forestry guidelines.



# New Zealand Falcon Management Guide Plantation Forestry

## BEST-PRACTICE FORESTRY GUIDELINES

**The New Zealand falcon, Karearea**, is a threatened species that is only found in New Zealand. Widespread habitat-loss has been a major factor in the decline of falcon populations, yet this species appears to be thriving in some plantation forests. The discovery of falcons breeding in pine plantations has significant implications for the conservation of this spectacular species. Plantation foresters that manage their estates to benefit biodiversity, especially threatened species like the falcon, stand to gain by meeting FSC certification requirements and by reinforcing their public image as responsible environmental stewards.

The falcons' habit of nesting **on the ground** can on occasion result in forestry operations disturbing or damaging nests. On the rare occasion that forestry operations encounter nesting falcons the following protocols should be followed to avoid any potentially negative effects.

**Figure 1. New Zealand falcon breeding season**



### How do I identify a nesting falcon?

>> Falcon nests are usually located within 200m of the border between a mature stand and a stand less than 4 years old. New Zealand falcons are a magpie-sized bird of prey, with a sharply hooked bill and long sleek wings (see info. sheet '*Recognising Karearea*'). During the breeding season, falcons defend their nests when approached by people or machinery. The distance at which they begin defensive behaviour differs between individual birds but a loud defensive 'kek kek kek' call usually begins within a few hundred metres of a nest. As the threat gets closer to the nest falcons become increasingly aggressive and initiate dive-bombing swoops. Within 50m of a nest dive-bombing escalates to falcons striking the intruder.

### Health & Safety

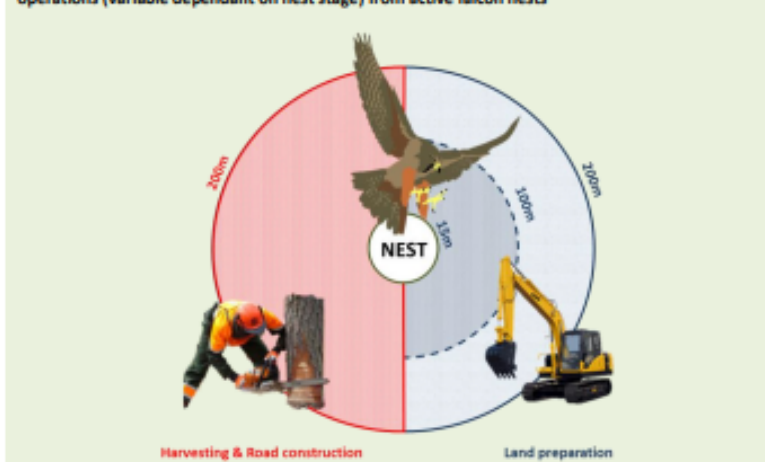
>> If it is necessary to approach a falcon nest, care must be taken to protect the eyes and head. Wearing a hard hat, sunglasses and holding a bushy branch over the head will provide protection from all but the most aggressive individuals. **Please note:** care should be taken not to let falcons strike hard hats repeatedly as they will damage their feet when striking the hard plastic.

Great care must also be taken not to stand on a nest while trying to negotiate pine slash and avoid dive-bombing falcons!

**How to avoid negative impacts to falcons >>** Negative impacts to falcon breeding can occur when mechanical operations such as tree harvesting, road construction (including skid sites), or land preparation (e.g. wind rowing) occur near an active falcon nest. This is especially the case during the time that falcons are incubating eggs or brooding young that are less than two weeks old.

To avoid impacting falcon breeding success we recommend that all mechanical operations are excluded from within 200m (line of sight) of a falcon nest for the whole time that the eggs and chicks are in the nest (approx. 75 days).

Figure 2. Recommended setbacks of harvesting, road construction (200m) and land preparation operations (variable dependant on nest stage) from active falcon nests



Where land preparation operations are near to a falcon nest, but operational constraints make 200m unworkable, we suggest reducing the setback to 100m. It should be noted however, that reducing the setback increases the risk of falcon nests being disturbed and failing as a result. If further constraints are apparent, land preparation operations may continue even closer than 100m, but **only if chicks are more than two weeks old\*** and no machines are to enter or disturb slash within 15m of the nest. Again, it should be noted that this significantly increases the risk of the nest being disturbed and it failing as a result.

Although it is clear that falcon nests can be disturbed by harvesting and road construction activities, there is limited information available on appropriate setback distances. Consequently, it is important to give greater consideration to achieving the 200m setback from harvesting and road construction activities. Where 200m is not practicable it is suggested that setbacks be reduced to no less than 100m, but include monitoring (and reporting to Wingspan) of nest success. Because reducing the setback distance will likely increase the risk of impacting falcon nest success the decision to do so must be made by the Environmental Manager.

\*Hint: A two week old chick is downy grey rather than white (see info. sheet 'Recognising Karearea')

### Summary Guidelines

1. Between August & March be vigilant for breeding falcons especially during the planning phase of harvesting, road construction & land preparation operations
2. All newly discovered nests and falcon sightings are to be reported to the Environment manager for advice on how to proceed
3. Physically mark the location of the nest (e.g. with flagging tape) so that operators know the area to avoid
4. If the nest cannot be located then setbacks should be measured from the location of any dive-bombing behaviour
5. Delay working in the area of the nest until the end of the operation in that area
6. Where possible all mechanical operations should avoid the area within 200m of the nest (line of sight) until all the chicks have fledged the nest
7. Where operational constraints make a 200m buffer unworkable land preparation operations can be reduced to 100m
8. Land preparation operations may continue further (up to 15m from a falcon nest) but only once chicks are two weeks old\*
9. Where possible setbacks around harvesting and road construction should not be reduced below 200m
10. Where operational constraints make a 200m buffer unworkable, harvesting and road construction can be reduced to 100m at the discretion of the Environmental Manager.

For further information on New Zealand falcon please visit [www.wingspan.co.nz](http://www.wingspan.co.nz)

**Appendix 2:** The Te Tihi o Rauhea, Conical Hill Reserve Switchback Project Lizard Management Plan, dated 3 May 2021.

### Appendix 3: Guidelines favoured by DOC to manage human disturbance around falcon nests.

From Appendix 1 of: Seaton, R., Holland, J. D., Minot, E. O., & Springett, B. P. (2009). Breeding success of New Zealand falcons (*Falco novaeseelandiae*) in a pine plantation. *New Zealand Journal of Ecology*, 32-39.

#### Appendix 1. Recommended instructions for forestry workers

When you get within 300–400 m of a falcon's nest, especially if you are on foot, they will start to fly and call 'kek-kek-kek'. The closer you get to the nest, the more aggressive and vocal the parent birds become and they will dive-bomb you. If the female is incubating and the male is away hunting, she may not come off the eggs until you are a few metres away.

Before land preparation starts (between September and February) walk through compartments less than 4 years old and look for falcons.

If forestry workers find falcons in a compartment we recommend they inform the Environmental Officer and observe the following steps:

Activity	Immediate response	Operational response
Falcons dive-bomb	Fall back 200-m radius	Continue operation after 75 days
Eggs are found	Fall back 200-m radius	Continue operation after 45 days
Small fluffy white chicks	Fall back 200-m radius	Continue operation after 20 days
Large grey chicks	Fall back 200-m radius	Continue operation after 20 days
Feathered chicks that cannot fly	Fall back 100-m radius	Continue operation after 15 days
Young falcons that can fly	No problem	Continue operation

**Appendix 4:** Guidelines on care and transport of an injured eastern kārearea/falcon from [https://www.wingspan.co.nz/bird\\_of\\_preym\\_rehabilitation.html](https://www.wingspan.co.nz/bird_of_preym_rehabilitation.html)

### Found An Injured Bird Of Prey And Need Help?



Injured birds of prey should be placed in a cardboard box or cat-box as soon as possible. Place an old towel or T-shirt in the box to stop the bird sliding around and to give it something to grip onto. Keep the inside of the box dark while maintaining plenty of air flow. Above all keep the bird out of direct sunlight and for both yours and the bird's sake keep handling to a bare minimum. The bird will be highly stressed and will want to defend itself, especially with its talons – excessive handling can hurt both you and the bird. Letting the bird grab hold of an old towel with its feet, then wrapping the birds wings in the towel to pick it up and put it in the box, can be an effective way of ensuring the feet are kept out of harm's way. Use both hands when picking a bird up and if possible get someone to help you put it safely into the box.

Once secured in a suitable box, take the injured bird to your local DOC office immediately. Encourage the DOC staff receiving the injured bird to contact us at the Wingspan National Bird of Prey Centre in Rotorua.

If a dead bird is found with a band on its leg, remove and flatten the band, note the time, cause of death if known, date and place the bird was found and forward the band and its details to the Banding Office. Never attempt to remove a band off a live bird – they are not designed to be easily removed and you will most likely break the bird's leg.

National Banding Office  
 Phone: 04 471 3294  
 Email: [bandingoffice@doc.govt.nz](mailto:bandingoffice@doc.govt.nz)  
 Address: PO Box 108 Wellington 6140  
 New Zealand

Wingspan Bird of Prey Centre  
 Phone 07 357 4469  
 Email: [wingspan@xtra.co.nz](mailto:wingspan@xtra.co.nz)  
 Address: 1334 Paradise Valley Road (from August 2018)  
 Ngongataha, Rotorua 3072, NZ