

# Kaimai Wind Farm: EIANZ Assessment Report

Report Number: 1708069-06.V2

Prepared for: Ventus Energy (NZ) Limited

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## 1.0 INTRODUCTION

This report<sup>1</sup>, prepared by Ecology New Zealand Limited (ENZL) for Ventus Energy (NZ) Limited ('the client'), presents the results of an Ecological Impact Assessment (EiA) undertaken through methodology/guidelines as described by the Environment Institute of Australia and New Zealand (EIANZ). This assessment has been requested by Hauraki District Council under s92 of the Resource Management Act 1991 subsequent to the lodgement of the application to construct a Wind Farm located on the north-western flanks of the Kaimai Ranges.

### 1.1 Overview of Ecological Investigations

The Ecological Effects Assessment (EEA) prepared by Kessels Ecology ('Kessels') provides a robust assessment of actual and potential ecological effects associated with the construction and operation of the proposed Kaimai Wind Farm. The ecological investigations undertaken by Kessels were conducted from 2009 to 2017 and provide robust multi-year ecological datasets that informed the ecological effects assessment. Key ecological matters covered in the Kessels report include vegetation communities, bats, avifauna, herpetofauna, invertebrates and freshwater ecology. Additional ecological reporting prepared by ENZL include the Supplementary Culvert Assessment Report (1708069-03, 18-10-2018) and the Supplementary Ecological Report (Supplementary Ecological Assessment (1708069-02, 14-6-18).

As this report is intended to be read as an addendum to previous ecology reporting, a full assessment of each ecological aspect has not been repeated.

## 2.0 EIANZ ASSESSMENT GUIDELINES

The EIANZ has prepared a set of guidelines to enable the identification, quantification and evaluation of the potential impacts of defined actions on ecosystems or their components. In essence, the EiA entails placing an ecological value on an ecosystem (or component of it), undertaking an assessment of the magnitude of effects in relation to the proposal, and running both these values against each other through a defined matrix to establish the proposed level of unmitigated effects. The result can provide an indication of the extent and nature of ecological management required. These guidelines were initially released in 2015 (Version 1), but were subject to feedback; with key areas of commentary including;

- The process of placing a value on species, vegetation/habitats/ecosystems and/or sites for Impact Assessment purposes;
- the potential for over-reliance on the matrix in decision-making; and
- the need to emphasise that these Guidelines are not just for use by ecologists working for a project developer or proponent, but are also intended to assist ecologists and planners processing applications in councils to check if all expected information is generally present and treated in an appropriate way.

The EiA EIANZ Version 1 (2015) guidelines were not used in this project due to industry feedback on its applicability.

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<sup>1</sup> This report is subject to the Report Limitations provided in Attachment A.

Version 2 of these guidelines have recently been released (2018)<sup>2</sup>, with previously received commentary prompting a review of thinking on some matters, and expansion of the text which aims to ensure that meanings are clear, and methods well explained. Due to the recent release of this updated guidance, few projects have undertaken assessment through these updated guidelines.

## 2.1 Ecological Value

As described within the EclA guidelines, ecological values have been assigned as 'Very High, High, Moderate, Low, or Negligible' based on species national threat status, Ecological Context, Representativeness, Rarity/Distinctiveness/Diversity and Pattern (Table 1, Table 2 and Table 3).

**Table 1:** Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/habitat/community (EclA Table 4).

Matters	Attributes to be considered
Representativeness	<p>Criteria for representative vegetation and aquatic habitats:</p> <ul style="list-style-type: none"> <li>• Typical structure and composition</li> <li>• Indigenous species dominate</li> <li>• Expected species and tiers are present</li> <li>• Thresholds may need to be lowered where all examples of a type are strongly modified</li> </ul> <p>Criteria for representative species and species assemblages:</p> <ul style="list-style-type: none"> <li>• Species assemblages that are typical of the habitat</li> <li>• Indigenous species that occur in most of the guilds expected for the habitat type</li> </ul>
Rarity/distinctiveness	<p>Criteria for rare/distinctive vegetation and habitats:</p> <ul style="list-style-type: none"> <li>• Naturally uncommon, or induced scarcity</li> <li>• Amount of habitat or vegetation remaining</li> <li>• Distinctive ecological features</li> <li>• National priority for protection</li> </ul> <p>Criteria for rare/distinctive species or species assemblages:</p> <ul style="list-style-type: none"> <li>• Habitat supporting nationally Threatened or At Risk species, or locally<sup>19</sup> uncommon species</li> <li>• Regional or national distribution limits of species or communities</li> <li>• Unusual species or assemblages</li> <li>• Endemism</li> </ul>
Diversity and Pattern	<ul style="list-style-type: none"> <li>• Level of natural diversity, abundance and distribution</li> <li>• Biodiversity reflecting underlying diversity</li> <li>• Biogeographical considerations – pattern, complexity</li> <li>• Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation</li> </ul>
Ecological context	<ul style="list-style-type: none"> <li>• Site history, and local environmental conditions which have influenced the development of habitats and communities</li> <li>• The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in RMA)</li> <li>• Size, shape and buffering</li> <li>• Condition and sensitivity to change</li> <li>• Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material</li> <li>• Species role in ecosystem functioning – high level, key species identification, habitat as proxy</li> </ul>

<sup>2</sup> Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. 2018. Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

**Table 2:** Factors to consider in assigning value to terrestrial species for EclA (EclA Table 5)

Determining factors	
Nationally Threatened species, found in the ZOI either permanently or seasonally	Very High
Species listed as At Risk – Declining, found in the ZOI, either permanently or seasonally	High
Species listed as any other category of At Risk, found in the ZOI either permanently or seasonally	Moderate
Locally (ED) uncommon or distinctive species	Moderate
Nationally and locally common indigenous species	Low
Exotic species, including pests, species having recreational value	Negligible

**Table 3:** Scoring for sites or areas combining values for four matters in EclA Table 4. (EclA Table 6)

Value	Description
Very High	Area rates High for 3 or all of the four assessment matters listed in <b>Table 4</b> . Likely to be nationally important and recognised as such.
High	Area rates High for 2 of the assessment matters, Moderate and Low for the remainder, or Area rates High for 1 of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	Area rates High for one matter, Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder Likely to be important at the level of the Ecological District.
Low	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates Very Low for 3 matters and Moderate, Low or Very Low for remainder.

## 2.2 Magnitude of Effects

The assessment of the predicted magnitude of effects is based on three key factors; the spatial extent of the footprint size, intensity and duration. Based on these factors, the magnitude of effects on the identified ecological value/s can be evaluated as 'Very High, High, Moderate, Low or Negligible' as aligned with guidance descriptions detailed in Table 3 below.

**Table 4:** Criteria for describing magnitude of effect (EclA Table 8)

Magnitude	Description
Very high	Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR Having a minor effect on the known population or range of the element/feature
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature

## 2.3 Unmitigated Level of Effects Assessment

The overall assessment of unmitigated effects is determined by the EclA guidelines through the use of a specific matrix, based specifically on the identified ecological value of the ecosystem/ecological component and the expected magnitude of effect. This quantum of overall effects is assessed on the absence of any efforts to avoid, remedy or mitigate any foreseeable ecological impacts. The levels of effects are evaluated as 'Very High, High, Moderate, Low, Negligible, or Positive'.

**Table 5:** Criteria for describing level of effects (EclA 10)

Ecological Value ► Magnitude ▼	Very high	High	Moderate	Low	Negligible
Very high	Very high	Very high	High	Moderate	Low
High	Very high	Very high	Moderate	Low	Very low
Moderate	High	High	Moderate	Low	Very low
Low	Moderate	Low	Low	Very low	Very low
Negligible	Low	Very Low	Very low	Very low	Very low
Positive	Net gain	Net gain	Net gain	Net gain	Net gain

## 3.0 BATS

### 3.1 Ecological Value

Long-tailed bats (*Chalinolobus tuberculatus*) are recognised as being present across the project area, with this species being detected during bioacoustic surveys undertaken by Kessels and ENZL<sup>34</sup>. This species is currently identified as having a national conservation threat status of 'Threatened – Nationally Critical'<sup>5</sup>. This species' threat status was recently increased due to being assessed as having populations (irrespective of size or number of subpopulations) with a very high ongoing or predicted decline (>70% within 10 years or three generations) and being conservation dependant. As described in **Table 2**, the ecological value of this species is considered 'Very High'.

Short-tailed bats (*Mystacina tuberculata rhyacobia*) have not been detected at any of the areas surveyed by Kessles Ecology or ENZL. The closest known historic records of this species are approximately 70km north from the proposed project area therefore their presence on site is not expected likely. This species is At Risk – Declining, with range restricted populations at 20,000 – 100,000 mature individuals, having a predicted decline of 10–50%<sup>6</sup>. As described in **Table 2**, the ecological value of this species is considered 'Moderate' on a conservative basis given they are not predicted to occur within the zone of influence (ZOI).

### 3.2 Magnitude of Effects

Predicted potential impacts on long-tailed bats are described in detail within Kessels' Ecological Effects Assessment (EEA), with further species data provided within the Supplementary Ecological Report (SER) prepared by ENZL. In summary, international studies highlight the potential for Wind Farms to significantly impact bats, largely through direct impacts associated with turbine blade collision and through barotrauma-related injury/death near turbine blades. However, within the New Zealand context, this has yet to be proven; with multi-year ecological monitoring on Te Uku Wind Farm concluding no significant impacts on bat activity levels<sup>7</sup>. This is in light of several turbines at Te Uku Wind Farm (Operational since 2011) being set back less than 80 metres from contiguous forest areas.

It is considered that impacts on resident bats associated with the Wind Farm may be classified as 'Low' for long-tailed bats and 'Negligible' for short-tailed bats. For short-tailed bats, this is due to their absence from the ZOI and there only confirmed historical presence 70km from the site. For Long-tailed bats, this 'Low' magnitude is due to the Wind Farms expected minor effect on this species national range and known population **Table 3**.

### 3.3 Unmitigated Level of Effects Assessment

The below assessment of unmitigated effects is based on the ecological values and magnitude of effects for both bat species. These valuations have been assessed through the assessment of unmitigated effects matrix detailed in **Table 5**. Based on an ecological value of 'Very High' and a magnitude of effect of 'Low', the overall level of unmitigated effects on long-tailed bats is assessed as 'Moderate'. Based on an ecological value of 'Moderate' and magnitude of effect of 'Negligible', the overall level of unmitigated effects on short-tailed bats is assessed as 'Very Low'.

<sup>3</sup> Kessels Ecology, March 2018. Kaimai Wind Farm, Ecological Effects Assessment

<sup>4</sup> Ecology New Zealand, June 2018. Kaimai Wind Farm: Supplementary Ecology Report

<sup>5</sup> O'Donnell, C.F.J.; Borkin, K.M.; Christie, J.E.; Lloyd, B.; Parsons, S.; Hitchmough, R.A. 2018: Conservation status of New Zealand bats, 2017. New Zealand Threat Classification Series 21. Department of Conservation, Wellington. 4 p

<sup>6</sup> O'Donnell, C.F.J.; Borkin, K.M.; Christie, J.E.; Lloyd, B.; Parsons, S.; Hitchmough, R.A. 2018: Conservation status of New Zealand bats, 2017. New Zealand Threat Classification Series 21. Department of Conservation, Wellington. 4 p

<sup>7</sup> Bull, L., Cummings, G. (2014). Project Te Uku Post-construction Avifauna & Bat Monitoring, Year 3 Annual Report Boffa Miskell Ltd

**Table 6:** Summary of unmitigated level of effects assessment

Species	Ecological Value	Magnitude of Effect	Overall Unmitigated Effect
<b>Long-tailed bat</b>	Very High	Low	Moderate
<b>Short-tailed bat</b>	Moderate	Negligible	Very Low

The above assessment, in line with EIANZ EclA guidelines, should result in the requirement for mitigation/biodiversity offset triggers to be considered specifically for long-tailed bats. Though a multiyear acoustic monitoring programme has indicated no significant impacts on local bats within proximity to another Waikato based Wind Farm<sup>7</sup>, Kessels, supported by ENZL, have taken a conservative approach to this potential impact in lieu of robust research within the New Zealand context. As a result, it has been recommended mitigation in the form of predator control is utilized as key mechanism to improve the survivorship and support the future of the Kaimai Ranges long-tailed bat metapopulation. Furthermore, on-going monitoring of long-tailed bats during the construction and operation phase of the project will act to provide up-to-date insight into potential un-foreseen impacts which may be addressed through adaptive management.

## 4.0 HERPETOFAUNA

### 4.1 Ecological Value

Two lizard species have been detected by ENZL within the project area, these include copper skink (*Oligosoma aeneum*) which is a non-threatened native species, and the introduced plague skink (*Lampropholis delicata*) which is recognised as an unwanted organism by the Ministry of Primary Industries. An additional 17 herpetofauna species are identified within the Kessels EEA which have been historically detected within Kaimai Ranges or neighbouring areas. These species are listed in Table 7 with associated ecological valuation detailed based on their current conservation status. Updates to this list in terms of accuracy of species descriptions and threat status have been made by ENZL.

Several threatened species identified by Kessels (included within Table 7) are extremely unlikely to occur within the Kaimai area due to range restrictions and expected historic/local extinctions. In the unlikely event one of these species do occur, this would represent an expansion in the current expected distribution of the species.



**Table 7:** Summary of ecological values for each herpetofauna species detailed within the Kessels EEA

Common Name	Scientific Name	Conservation Status	Ecological Value
<b>Auckland green gecko</b>	<i>Naultinus elegans</i>	At Risk- Declining	High
<b>Chevron skink</b>	<i>Oligosoma homalonotum</i>	Threatened- Nationally Vulnerable	Very High*
<b>Common gecko</b>	<i>Woodworthia maculatus</i>	Not Threatened	Low
<b>Copper skink</b>	<i>Oligosoma aeneum</i>	Not Threatened	Low
<b>Duvaucel's gecko</b>	<i>Hoplodactylus duvaucelii</i>	At Risk- Relict	Moderate*
<b>Forest gecko</b>	<i>Mokopirirakau granulatus</i>	At Risk- Declining	High
<b>Hochstetter's frog</b>	<i>Leiopelma hochstetteri</i> sensu stricto	At Risk- Declining	High
<b>Marbled skink</b>	<i>Oligosoma oliveri</i>	At Risk- Relict	Moderate*
<b>McGregor's skink</b>	<i>Oligosoma macgregori</i>	At Risk- Recovering	Moderate*
<b>Moko skink</b>	<i>Oligosoma moco</i>	At Risk- Relict	Moderate
<b>Ornate skink</b>	<i>Oligosoma ornatum</i>	At Risk- Declining	High
<b>Pacific gecko</b>	<i>Dactylocnemis pacificus</i>	At Risk- Relict	Moderate
<b>Plague Skink</b>	<i>Lampropholis delicata</i>	Introduced and Naturalised	Negligible
<b>Robust skink</b>	<i>Oligosoma alani</i>	At Risk- Recovering	Moderate*
<b>Shore skink</b>	<i>Oligosoma smithi</i>	At Risk – Naturally Uncommon	Moderate*
<b>Small scaled skink</b>	<i>Oligosoma microlepis</i>	Threatened- Nationally Vulnerable	Very High*
<b>Speckled skink</b>	<i>Oligosoma</i> <i>infrapunctatum</i>	At Risk- Declining	High*
<b>Striped skink</b>	<i>Oligosoma striatum</i>	At Risk - Declining	High
<b>Whitaker's skink</b>	<i>Oligosoma whitakeri</i>	Threatened- Nationally Endangered	Very High*

\*Species highly unlikely to occur within the ZOI.

## 4.2 Magnitude of Effects

The available habitat found across the project footprint is dominated by farmland, with small pockets of mature treeland and a tract of Significant Natural Area classified vegetation to the South of the site. With the exception of partial vegetation clearance on a single pocket of mature treeland<sup>8</sup>, the construction of each turbine and associated roading is expected to occur on actively grazed farmland. This habitat provides low quality habitat for gecko species and marginal habitat for terrestrial skink species. The following magnitude of impacts for each species is drawn on spatial extent of impacts, intensity, duration. The list of herpetofauna produced by Kessels does not include expert assessment on the likelihood of each of these species occurring, for that reason this parameter has also been included when assessing potential magnitude of effects.

**Table 8:** Summary of magnitude of effects for each herpetofauna species

Common Name	Magnitude of Effect
<b>Auckland green gecko</b>	Negligible
<b>Chevron skink</b>	Negligible
<b>Common gecko</b>	Negligible
<b>Copper skink</b>	Negligible
<b>Duvaucel's gecko</b>	Negligible
<b>Forest gecko</b>	Negligible
<b>Hochstetter's frog</b>	Low
<b>Marbled skink</b>	Negligible
<b>McGregor's skink</b>	Negligible
<b>Moko skink</b>	Negligible
<b>Ornate skink</b>	Low
<b>Pacific gecko</b>	Negligible
<b>Plague Skink</b>	Negligible
<b>Robust skink</b>	Negligible
<b>Shore skink</b>	Negligible
<b>Small scaled skink</b>	Negligible
<b>Speckled skink</b>	Negligible
<b>Striped skink</b>	Low
<b>Whitaker's skink</b>	Negligible

<sup>8</sup> Ecology New Zealand, June 2018. Kaimai Wind Farm: Supplementary Ecology Report

### 4.3 Unmitigated Level of Effects Assessment

The below assessment of unmitigated effects is based on the ecological values and magnitude of effects for all described herpetofauna species described within the Kessels EEA report. The threatened species which are identified in these relevant tables are expected to be highly unlikely to occur within the project's footprint. Based on this matrices approach, the overall unmitigated level of effects for native herpetofauna is described 'Low – Very Low'. Under the EclA, this overall assessment is considered to 'not normally be of concern'. Despite this, all lizards are absolutely protected under the Wildlife Act 1953, therefore it is recommended that at minimum, mitigation is carried out to relocate lizards out of the way of construction.

*Table 9: Summary of magnitude of effects for each herpetofauna species*

Common Name	Ecological Value	Magnitude of Effect	Overall Unmitigated Effect
<b>Auckland green gecko</b>	High	Negligible	Very Low
<b>Chevron skink</b>	Very High	Negligible	Low
<b>Common gecko</b>	Low	Negligible	Very Low
<b>Copper skink</b>	Low	Negligible	Very Low
<b>Duvaucel's gecko</b>	Moderate	Negligible	Very Low
<b>Forest gecko</b>	High	Negligible	Very Low
<b>Hochstetter's frog</b>	High	Low	Low
<b>Marbled skink</b>	Moderate	Negligible	Very Low
<b>McGregor's skink</b>	Moderate	Negligible	Very Low
<b>Moko skink</b>	Moderate	Negligible	Very Low
<b>Ornate skink</b>	High	Low	Low
<b>Pacific gecko</b>	Moderate	Negligible	Very Low
<b>Plague Skink</b>	Negligible	Negligible	Very Low
<b>Robust skink</b>	Moderate	Negligible	Very Low
<b>Shore skink</b>	Moderate	Negligible	Very Low
<b>Small scaled skink</b>	Very High	Negligible	Low
<b>Speckled skink</b>	High	Negligible	Very Low
<b>Striped skink</b>	High	Low	Low
<b>Whitaker's skink</b>	Very High	Negligible	Low

## 5.0 BIRDS

### 5.1 Ecological Value

Several bird species have been detected by Kessels across the project area during avifauna survey efforts. These included forest birds, a shore bird species, and bird species common within agricultural landscapes<sup>9</sup>. Desktop investigations and discussions with experts by Kessels provide additional species which have the potential to be located within the Kaimai Ranges area or have the potential to migrate over the Kaimai Ranges. A summary of these species is listed in Table 10 with their associated ecological valuation based on their current conservation status. Updates to the bird species lists provided by Kessels have been undertaken by ENZL in terms of accuracy of scientific names and threat status.

**Table 10:** Summary of ecological values for each native bird species detailed within the Kessels EEA

Common Name	Scientific Name	Conservation Status	Ecological Value
<b>Australasian bittern</b>	<i>Botaurus poiciloptilus</i>	Threatened- Nationally Critical	Very High
<b>Banded dotterel</b>	<i>Charadrius bicinctus</i>	Threatened- Nationally Vulnerable	Very High
<b>Banded rail</b>	<i>Gallirallus philippensis</i>	At Risk- Declining	Moderate
<b>Bellbird *</b>	<i>Anthornis melanura</i>	Not Threatened	Low
<b>Black petrel</b>	<i>Procellaria parkinsoni</i>	Threatened- Nationally Vulnerable	Very High
<b>Eastern bar-tailed godwit</b>	<i>Limosa lapponica bauer</i>	At Risk- Declining	High
<b>Fantail *</b>	<i>Rhipidura fuliginosa</i>	Not Threatened	Low
<b>Fernbird</b>	<i>Megalurus punctatus</i>	At Risk- Declining	Moderate
<b>Grey warbler *</b>	<i>Gerygone igata</i>	Not Threatened	Low
<b>Grey-faced petrel</b>	<i>Pterodroma gouldi</i>	Not Threatened	Low
<b>Kaka *</b>	<i>Nestor meridionalis septentrionalis</i>	At Risk - Recovering	High
<b>Kereru *</b>	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	Low
<b>Kingfisher *</b>	<i>Todiramphus sanctus</i>	Not Threatened	Low
<b>Lesser knot</b>	<i>Calidris canutus</i>	Threatened- Nationally Vulnerable	Very High
<b>Long-tailed cuckoo</b>	<i>Eurodynamis taitensis</i>	At Risk- Naturally Uncommon	Moderate
<b>Marsh crake</b>	<i>Porzana pusilla affinis</i>	At Risk- Declining	Moderate
<b>Morepork *</b>	<i>Ninox novaeseelandiae</i>	Not Threatened	Low

<sup>9</sup> Kessels Ecology, March 2018. Kaimai Wind Farm, Ecological Effects Assessment

<b>New Zealand dotterel (Northern)</b>	<i>Charadrius obscurus aquilonius</i>	At Risk- Recovering	High
<b>New Zealand falcon</b>	<i>Falco novaeseelandiae</i>	At Risk- Recovering	Moderate
<b>New Zealand pipit *</b>	<i>Anthus novaeseelandiae</i>	At Risk-Declining	High
<b>Paradise duck *</b>	<i>Tadorna variegata</i>	Not Threatened	Low
<b>Pied oystercatcher (South Island) *</b>	<i>Haematopus finschi</i>	At Risk- Declining	High
<b>Pied stilt</b>	<i>Himantopus himantopus</i>	Not Threatened	Low
<b>Rifleman</b>	<i>Acanthisitta chloris</i>	At Risk- Declining	Moderate
<b>Shining cuckoo *</b>	<i>Chrysococcyx lucidus</i>	Not Threatened	Low
<b>Silvereye *</b>	<i>Zosterops lateralis</i>	Not Threatened	Low
<b>Spotless crane</b>	<i>Porzana tabuensis</i>	At Risk- Declining	Moderate
<b>Spur-winged plover *</b>	<i>Vanellus miles</i>	Not Threatened	Low
<b>Swamp Harrier *</b>	<i>Circus approximans</i>	Not Threatened	Low
<b>Tomtit *</b>	<i>Petroica macrocephala</i>	Not Threatened	Low
<b>Tui *</b>	<i>Prothemadera novaeseelandiae</i>	Not Threatened	Low
<b>Turnstone</b>	<i>Arenaria interpres</i>	Migrant (IUCN – Least Concern)	Low
<b>Variable oystercatcher</b>	<i>Haematopus unicolor</i>	At Risk- Recovering	High
<b>Welcome swallow *</b>	<i>Hirundo neoxena</i>	Not Threatened	Low
<b>Wrybill</b>	<i>Anarhynchus frontalis</i>	Threatened- Nationally Vulnerable	Very High

\* Identified on-site

## 5.2 Magnitude of Effects

As described above, the available habitat found across the project footprint is dominated by farmland, with small pockets of mature treeland and a tract of Significant Natural Area classified vegetation to the South of the site. With the exception of partial vegetation clearance on a single pocket of mature treeland<sup>10</sup>, the construction of each turbine and associated roading is expected to occur on actively grazed farmland. This habitat provides low quality habitat for native bird species. The following magnitude of impacts for each species is drawn on habitat availability, spatial extent of impacts, intensity, duration.

<sup>10</sup> Ecology New Zealand, June 2018. Kaimai Wind Farm: Supplementary Ecology Report

**Table 11:** Summary of magnitude of effects for each bird species

Common Name	Magnitude of Effects
<b>Australasian bittern</b>	<i>Negligible</i>
<b>Banded dotterel</b>	<i>Negligible</i>
<b>Banded rail</b>	<i>Negligible</i>
<b>Bellbird</b>	<i>Negligible</i>
<b>Black petrel</b>	<i>Negligible</i>
<b>Eastern bar-tailed godwit</b>	<i>Low</i>
<b>Fantail</b>	<i>Negligible</i>
<b>Fernbird</b>	<i>Negligible</i>
<b>Grey warbler</b>	<i>Negligible</i>
<b>Grey-faced petrel</b>	<i>Negligible</i>
<b>Kaka</b>	<i>Low</i>
<b>Kereru</b>	<i>Negligible</i>
<b>Kingfisher</b>	<i>Negligible</i>
<b>Lesser knot</b>	<i>Negligible</i>
<b>Long-tailed cuckoo</b>	<i>Negligible</i>
<b>Marsh crake</b>	<i>Negligible</i>
<b>Morepork</b>	<i>Negligible</i>
<b>New Zealand dotterel (Northern)</b>	<i>Negligible</i>
<b>New Zealand falcon</b>	<i>Low</i>
<b>New Zealand pipit</b>	<i>Low</i>
<b>Paradise duck</b>	<i>Negligible</i>
<b>Pied oystercatcher (South Island)</b>	<i>Low</i>
<b>Pied stilt</b>	<i>Negligible</i>
<b>Rifleman</b>	<i>Negligible</i>
<b>Shining cuckoo</b>	<i>Negligible</i>
<b>Silvereye</b>	<i>Negligible</i>
<b>Spotless crake</b>	<i>Negligible</i>

<b>Spur-winged plover</b>	<i>Negligible</i>
<b>Swamp Harrier</b>	<i>Negligible</i>
<b>Tomtit</b>	<i>Negligible</i>
<b>Tui</b>	<i>Negligible</i>
<b>Turnstone</b>	<i>Negligible</i>
<b>Variable oystercatcher</b>	<i>Negligible</i>
<b>Welcome swallow</b>	<i>Negligible</i>
<b>Wrybill</b>	<i>Negligible</i>

### 5.3 Assessment of Unmitigated Effects

The below assessment of unmitigated effects is based on the ecological values and magnitude of effects for all described bird species described within the Kessels EEA report. Based on this matrices approach, the overall unmitigated level of effects for native birds is described 'Low – Very Low'. Under the EclA, this overall assessment is considered to 'not normally be of concern'. Kessels supported by ENZL, have taken a conservative approach and have recommended contributions to conservation activities/research for the low potential strike risks on migratory shorebirds.

Though solely attributed for mitigation for freshwater and bat values, the revegetation of the site's headwater catchment areas and recommended predator control efforts will provide additional benefits to local forest bird species.

*Table 12: Summary of magnitude of effects for each bird species*

Common Name	Ecological Value	Magnitude of Effect	Overall Unmitigated Effect
<b>Australasian bittern</b>	Very High	<i>Negligible</i>	<i>Low</i>
<b>Banded dotterel</b>	Very High	<i>Negligible</i>	<i>Low</i>
<b>Banded rail</b>	Moderate	<i>Negligible</i>	<i>Very Low</i>
<b>Bellbird</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Black petrel</b>	Very High	<i>Negligible</i>	<i>Low</i>
<b>Eastern bar-tailed godwit</b>	High	<i>Low</i>	<i>Low</i>
<b>Fantail *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Fernbird</b>	Moderate	<i>Negligible</i>	<i>Very Low</i>
<b>Grey warbler *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Grey-faced petrel</b>	Low	<i>Negligible</i>	<i>Very Low</i>

<b>Kaka (North Island) *</b>	High	<i>Low</i>	<i>Low</i>
<b>Kereru *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Kingfisher *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Lesser knot</b>	Very High	<i>Negligible</i>	<i>Low</i>
<b>Long-tailed cuckoo</b>	Moderate	<i>Negligible</i>	<i>Very Low</i>
<b>Marsh crake</b>	Moderate	<i>Negligible</i>	<i>Very Low</i>
<b>Morepork *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>New Zealand dotterel (Northern)</b>	High	<i>Negligible</i>	<i>Very Low</i>
<b>New Zealand falcon</b>	Moderate	<i>Low</i>	<i>Low</i>
<b>New Zealand pipit *</b>	High	<i>Low</i>	<i>Low</i>
<b>Paradise duck *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Pied oystercatcher (South Island) *</b>	High	<i>Low</i>	<i>Low</i>
<b>Pied stilt</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Rifleman</b>	Moderate	<i>Negligible</i>	<i>Very Low</i>
<b>Shining cuckoo *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Silvereye *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Spotless crake</b>	Moderate	<i>Negligible</i>	<i>Very Low</i>
<b>Spur-winged plover *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Swamp Harrier *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Tomtit *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Tui *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Turnstone</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Variable oystercatcher</b>	High	<i>Negligible</i>	<i>Very Low</i>
<b>Welcome swallow *</b>	Low	<i>Negligible</i>	<i>Very Low</i>
<b>Wrybill</b>	Very High	<i>Negligible</i>	<i>Low</i>



## **6.0 CONCLUSION**

The above EcIA has been undertaken through EIANZ version 2 guidelines. The conclusions drawn within this assessment for bats, birds and herpetofauna are in large synonymous with those stated in both Kessels and ENZL ecological reporting. These findings support recommendations made by Kessels and ENZL, specifically in regard to mitigation to address levels of residual uncertainty within the assessments.



# ATTACHMENT A

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