

4th November 2021

Kapuni Green Hydrogen Expert Consenting Panel
C/- June Cahill
Environmental Protection Agency

Dear Panel,

Kapuni Green Hydrogen Project – Response to Department of Conservation Comments

Hiringa Energy Limited and Ballance Agri-Nutrients Limited (the Applicants) have reviewed the comments received from the Department of Conservation (DOC) in relation to the Kapuni Green Hydrogen Project 'Fast Track' application. The DOC comments were received late, but were accepted by the Panel, with the applicant's response to the comments required by 04 November 2021.

The Applicant's responses to the comments are provided in the **attached** document and are supplemented and supported by the Statement of Evidence from Stephen Fuller, Boffa Miskell (Ecology), which is attached as Appendix 1.

Yours sincerely



Catherine Clennett

Chair, Hiringa Energy Limited



Andrew Clennett

CEO, Hiringa Energy Limited

1. Department of Conservation

1.1. Comment by DOC

Given not all pathways of NZ migrants e.g., oystercatchers, wrybills or international migratory birds are known it is unclear how the applicant has come to this conclusion. As such it is recommended that the applicant appropriately account for potential effect on migratory birds by developing a Bird Collision Monitoring Plan to measure the rates of bird mortality from collisions. This monitoring should be tailored around migration periods and potential bird collision for at least the first three years of the projects operation. The bird collision monitoring should be measured against mortality predictions for individual species with review thresholds. It is also recommended that mitigation and/or compensation for bird mortalities be implemented.

Response:

Please refer to the attached expert ecology evidence provided from Stephen Fuller of Boffa Miskell.

The Boffa Miskell Ecological Impact Assessment, the Statement of Evidence of Mr Fuller and the independent peer review by Dr John Craig conclude that based on collision risk to migrant birds, post-construction collision monitoring is not justified. The above experts consider there is significant knowledge on migrant bird movements to understand collision risk and the need for mortality modelling, mitigation and compensation.

The experts consider that the site does not lie in a flyway for migrant birds, which are more likely to follow the coast around Taranaki or cross the Taranaki bite to the east of the site. The experts consider that the likelihood of occasional migrant birds crossing the site is not zero but consider that these will be stochastic events that cannot be predicted or modelled and will not be in numbers sufficient to be considered a risk for these species.

The experts state that post-construction mortality monitoring is a difficult and involved process that should not be undertaken lightly and imposed by default. The program proposed by DOC is considered disproportionate to the project size and the risk of effects being realised.

Based on the mortality risk and monitoring effort required, the experts consider post-construction collision monitoring is not justified with precedent for this approach at wind farm sites with comparable risk.

1.2. Comment by DOC

The application (Appendix J.1 – Ecological Assessment) notes that lizard species may be present in the hedgerows and that parts of the hedgerows will be removed as part of the project. The Ecological Assessment recommends that a lizard survey is conducted (by a suitably conducted ecologist) prior to any works, and if lizards are detected, that a lizard management plan should be prepared. The Ecological Assessment also notes that a Wildlife Act permit would be required for any lizard salvage and/ or relocation.

In reviewing the proposed conditions (Appendix O), it does not appear that the recommendation for a lizard survey and subsequent lizard management plan, has been carried through.

Response:

The applicant acknowledges the exclusion of consent conditions relating to a lizard survey and lizard management as an oversight. Mr Fuller has addressed this matter in his statement of evidence and has recommended two consent conditions and an advice note. Our planning expert Cam Twigley has reviewed the consent conditions and has made some suggested amendments to make the conditions more effective and certain. The consent conditions and advice note proposed are as follows:

Upon finalisation of infrastructure plans and associated extents and locations of hedgerow and riparian vegetation clearance (including associated grassland), a lizard survey must be conducted in these proposed vegetation clearance areas by a suitably qualified and experienced ecologist. The results of the lizard survey shall be provided to the Group Manager – Environmental Services, South Taranaki District Council.

*If indigenous lizards are detected during the lizard survey outlined in condition **, then a Lizard Management Plan (LMP) shall be prepared by a suitably qualified and experienced herpetologist with the objective to avoid and minimise effects of the vegetation clearance on indigenous lizards. At least 20 working days prior to the commencement of vegetation clearance activities the consent holder shall submit the LMP to the Group Manager – Environmental Services, South Taranaki District Council for certification that the LMP meets the above mentioned objective. The LMP must include (but is not restricted to) the following:*

- a. An assessment of indigenous lizards present within the vegetation clearance areas;*
- b. Methods and timing for lizard salvage and relocation, or a description of alternative mitigation measures if the project herpetologist considers salvage to be unsuitable. This must be determined in consultation with the Department of Conservation;*
- c. Identification of an appropriate relocation site/s (if lizard salvage and relocation is being conducted) and measures to enhance the habitat quality of the relocation site/s for lizards prior to relocation, such as habitat enhancement or pest control;*
- d. Any ongoing management requirements, such as post-release monitoring or pest control.*

Advice Note: To survey, capture, relocate, or otherwise disturb lizards, a Wildlife Act Authority (“permit”) must be obtained from the Department of Conservation.

HIRINGA

Mr Twigley has recommended that these consent conditions should be added to the draft consent conditions provided in Appendix O of the consent application under the subheading Ecological Management / Mitigation. Mr Twigley also recommends that the Lizard Management Plan be added to the list of management plans referred to in proposed condition 6 within Appendix O.

Appendix 1: Statement of Expert Evidence from Stephen Fuller (Ecology evidence)

BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY

IN THE MATTER OF

the COVID-19 Recovery (Fast-track Consenting) Act 2020 ('the Act')

AND

IN THE MATTER

of the application by Hiringa Energy Ltd and Ballance Agri-Nutrients Ltd to establish and operate a renewable wind energy facility with associated hydrogen production, storage, offtake and refueling infrastructure.

STATEMENT OF ECOLOGY EVIDENCE OF STEPHEN ANDREW FULLER

04 November 2021

INTRODUCTION

Qualifications and Experience

- 1 My name is Stephen Andrew Fuller.
- 2 I am senior ecologist and Partner with Boffa Miskell Limited (BML). I have worked as an applied ecologist over much of the last 40 years, including employment with the Department of Lands and Survey and the Botany Division of DSIR, when I conducted biological surveys of scenic reserves in the lower and central North Island. From 1992 to 1997 I ran my own ecological consultancy. From 1997 to 2002 I was the project manager responsible for the design and development of the Karori Wildlife Sanctuary. In November 2002 I joined BML.
- 3 I hold a Bachelor of Science in Zoology and Botany, and a Diploma of Applied Science in Ecology from Victoria University of Wellington. I am a Certified Environmental Practitioner with the Environment Institute of Australia and New Zealand.
- 4 My professional memberships include:
 - (a) The Environment Institute of Australia and New Zealand;
 - (b) The New Zealand Ecological Society; and
 - (c) The Wellington Botanical Society.
- 5 I work primarily in the area of ecological impact assessment, the determination and design of mitigation requirements, and ecological restoration. My work covers a range of fields including the mapping and description of terrestrial flora and fauna, freshwater habitat descriptions and monitoring, and avifauna studies. I work primarily in the North Island but have carried out assessments and assisted colleagues throughout New Zealand.

Wind farm experience

- 6 Since 2003 I have been involved in assessing 14 wind farm sites in Northland, Waikato, Taranaki, Manawatu, Hawkes Bay, Wellington,

Canterbury and Southland. This work has included carrying out effects' assessments, designing and conducting pre-construction baseline surveys, construction monitoring and post construction monitoring. Of these 14 sites, seven have been built and construction of another is about to commence. In each case the risk to avifauna of collision or displacement was a key consideration.

- 7 I designed and carried out the first comprehensive avifauna assessment at a windfarm in New Zealand; West Wind Wind Farm. This was a baseline study which followed international best practice, modified as necessary for New Zealand conditions.
- 8 In 2008 and 2009, I designed the methodology and implemented the first post construction mortality searches at a wind farm in New Zealand, trialing the method first at Te Apiti Wind Farm, then implementing it at West Wind Wind Farm.
- 9 In 2007 and 2008, I introduced radar to the study of collision risk at wind farms in New Zealand. This was at the proposed Taharoa C Wind Farm at Kawhia Harbour. During this study we made detailed observations of the movement and behaviour of over 6,000 flocks of migrant birds.
- 10 In 2013 I co-authored guidance for ecological assessments for the New Zealand Wind Energy Association, which was incorporated in part into their current guidance (New Zealand Wind Energy Association, 2013). I have presented regularly at the (NZWEA) annual conference regarding the risk to birds, the results of my studies at various wind farms, and the factors that lead to good wind farm design.
- 11 Also in 2013, I was co-author of the first multi-year post-construction monitoring study in New Zealand (Bull et al., 2013); West Wind Wind Farm. This study followed international best practice at the time, while adapting to New Zealand conditions and species. This post-construction study confirmed the level of effect and species impacted as described in my affects assessment for this wind farm (refer to paragraph 7 above).
- 12 In summary, since my first windfarm project in 2003, I have spent almost two decades investigating the habitat use, and behaviours of birds in the

landscapes where wind farms are proposed, as well as their behaviours where wind farms have been built.

- 13 I am familiar with the Kapuni site and the surrounding locality having visited the site on two occasions, trained the ornithologist carrying out the field observation, and assisted in preparation and reviewed the Ecological Impact Assessment (Boffa Miskell Ltd, 2021).
- 14 I have read the relevant parts of the application material, and of the various iterations of the project as it has developed. I have also read the submission filed on behalf of the Director General for Conservation.

Expert Witness Code of Conduct

- 15 While this is not a hearing before the Environment Court, I confirm that I have read, and agree to comply with, the Environment Court's Code of Conduct for Expert Witnesses (Environment Court of New Zealand Practice Note 2014). This evidence I am presenting has been prepared in accordance with the Code and is within my area of my expertise, except where I state that I am relying on the evidence of another person. To the best of my knowledge, I have not omitted to consider any material facts known to me that might alter or detract from the opinions I express.

RESPONSE TO COMMENTS

- 16 I have been asked to specifically comment on the following statement contained in the Department of Conservation's submission on the application. I respond as follows.

Consultation & Independent Review

- 17 Prior to development of our Ecological Impact Assessment the methods and results of our bird study were provided to the Department of Conservation for their comment. Feedback was provided by the Department, including a request for further explanation of the methods, consideration of the likelihood of bats, consideration of a range of threatened or at-risk species, that had not been seen on site but were present in the North Island, and recommendations for additional study of migrants.

- 18 I reviewed these comments, and the assessment was expanded to address the issues raised. This included additional information in the methods regarding the choice of sampling method, the addition of a bat survey, and additional discussion and analysis on the likelihood and risk of migrant birds being present at this site.
- 19 An independent reviewer, Dr John Craig, was then commissioned by the applicant to consider our responses in light of the Department's comments. Dr Craig's experience in windfarm assessment includes involvement in ecological assessments of 11 windfarms from Otago to Northland, and includes co-authoring of the assessment of effects on migrant birds at the proposed Taharoa Windfarm. In his review, Dr Craig was satisfied that our assessment addressed the issues the Department raised and he agreed that additional migrant surveys were not required (Craig, 2021).
- 20 Note that the initial Department feedback was appended to the Ecological Impact Assessment (Appendix H).

Migratory Birds

- 21 The submission from the Department repeats one of the areas of their initial feedback, specifically in relation to migrant birds. It states:

The application notes that bird strike has the potential to be an adverse effect but this is mitigated by their view that the site is not located on a key route for migratory birds and that the turbines are arranged in a north-south alignment further reducing the exposure to migration. Given these points the applicant considers there is no need for avoidance or mitigation measures.

Given not all pathways of NZ migrants e.g., oystercatchers, wrybills or international migratory birds are known it is unclear how the applicant has come to this conclusion. As such it is recommended that the applicant appropriately account for potential effect on migratory birds by developing a Bird Collision Monitoring Plan to measure the rates of bird mortality from collisions. This monitoring should be tailored around migration periods and potential bird collision for at least the first three years of the projects operation. The bird collision monitoring should be measured against mortality predictions for individual species with review thresholds. It is also

recommended that mitigation and/or compensation for bird mortalities be implemented.” (DOC 2021)

- 22 The Department’s position appears to be that because “*not all pathways of NZ migrants are known*” we cannot determine whether the wind farm will have an adverse effect.
- 23 I do not consider that this is a reasonable position. While not all migratory pathways are “known” those of us who have carried out a number of windfarm assessments in areas where migrants occur, understand many aspects of these migration events, have an understanding of the behaviours and physical abilities of the birds that migrate, have observed, recorded and analysed migrant bird movements in considerable detail at a number of key sites, and continue to build on the windows of observation and knowledge with survey data from each new site that we assess. I believe that there is sufficient knowledge on migrant movement in New Zealand to allow us to understand risk and make informed assessments of potential adverse effects. It is my opinion that an assessment of risk does not require absolute certainty.
- 24 In the Ecological Impact Assessment, all these areas of knowledge and understanding of domestic migration events, and the reasoning for the methods used, are described in a number of locations, as follows.
- 25 In our methodology we started with a desktop evaluation (*Section 4.4.2, page 12, See Addendum 1*) which concluded that the site was unlikely to be a migrant flight path. However, for the avoidance of doubt it recommended that observations be carried out for two weeks during the peak northward movement of South Island Pied Oystercatcher (SIPO) in January 2020. If significant numbers of migrants were observed, we would then move to more comprehensive migrant monitoring. I considered that this would be sufficient to determine if migrants crossed the site in sufficient numbers for there to be a risk of collision.
- 26 The results of the study were that a single SIPO crossed the site over two weeks. In contrast, over the same period this study observed larger numbers of SIPO at some distance to the east, following a predicted flight path east of Mt Taranaki and in the vicinity of SH3 (*Section 5.6.4, See Addendum 2*). This was anticipated based both on the thinking of Southey

(2009) and my own knowledge of flight behaviour of this species from other sites including Taharoa and the nearby Waverley (Waipipi) Wind Farm. The independent reviewer wrote:

“The field work at the site of the proposed windfarm was undertaken in January which is the peak of the migration time for SIPO. Counts were undertaken between 06 – 10am which is ideal for resident species and would have included the start of the peak migration time as extrapolated from the timing of flights at both Taharoa and Hauāuru mā raki (HMR). If the site was on a major migration route flocks of SIPO and others could have been expected. In addition to the field work, bioacoustic monitors were positioned at the sites of the proposed turbines for the duration of the night. These would have picked up any flocks migrating at night.

Hence the methodology was totally adequate for detecting possible passes by shorebirds. That only one SIPO and a small number of pied stilt crossed the site is adequate confirmation of the desk top exercise which determined that the site was highly unlikely to be on a migration route. Numbers given in Table 18 reinforce this conclusion.” (Dr J Craig 2021)

- 27 Following this initial migration study, we considered the need for additional investigation and/or the potential use of radar. We considered the location of the site, the distance from the coastal flyway, the lack of landscape features that migrants might navigate by, its location in relation to Mt Taranaki, its location in relation to the extensive farmland surrounding it, the absence of habitat to roost, and the numbers of migrant birds observed during our study of this migration event. We concluded, based on all of these factors, that additional study or the use of radar was not necessary (Section 4.4.4, page 14, See Addendum 1). The independent reviewer wrote:

The comment from DOC that doppler radar should also have been used for the full migratory season is an inappropriate request given the desktop and field results. I support the decision not to use radar” (Dr J Craig 2021).

- 28 In response to the Department’s initial review we added a section to the assessment called “Birds not seen” (Section 5.6.2) where birds not seen at the site and not seen locally were assessed. We concluded that the site did not provide core or seasonal habitat for any of these species. We further noted that of the five most abundant migrants, four (banded

dotterel, black stilt, eastern bar-tailed godwit and wrybill) have not been recorded in the area and were not recorded by our summer survey. The independent reviewer wrote:

“This request again appears to confuse a desire to know versus a calculation of the risk of an adverse effect. A list of threatened species are provided for comment and the approach of the Assessment is entirely appropriate.

It is possible that if enough observations are made over many years that some, but not all, of the named species may be observed in the vicinity of the proposed windfarm. The approach of Boffa Miskell is appropriate.

Firstly, they point to the relationship between a sighting and the risk of an effect. Scottish Natural Heritage¹ provide estimates of avoidance rates for different groups of birds. The avoidance rate is calculated as the difference between the number of birds seen flying at RSH and through the proposed windfarm versus the number of that species known to be killed. This rate allows a quick calculation of the number of flights at RSH that would be needed to average one mortality. They provide a worked example from Waverley for SIPO. The lowest Avoidance rates are 95% and the highest 99.9%.

Secondly, the Assessment checks in the NZ Bird Atlas whether there are any records from multiple observers for the 10km x 10km grid square. Birds not recorded in that large an area are extremely unlikely to cross the site of the proposed windfarm. Some are known from multiple windfarms to never be seen at RSH. The Assessment gives the example of the New Zealand pipit and that concurs with all data I have seen and collected.” (Dr J Craig 2021).

- 29 In our Assessment of Effects (Section 8.4.2) we compared the observations at this site with those at two others along the western migratory pathway, Taharoa and Waipipi (formerly named Waverley) as a way to put the risk to migrants at this site in context with sites that had numerous migrant movements. This comparison shows why we do not consider mortality monitoring is required (See Addendum 3). Both of the other sites had sufficient migrant activity to require collision modelling and based on this modelling some mortalities were predicted. However, at both sites the number of SIPO present during the peak were orders of

¹ Scottish Natural Heritage. (2018). *Avoidance rates for the onshore SNH wind farm collision risk model*. Scottish Natural Heritage. <https://www.nature.scot/>

magnitude higher than at Kapuni. My experience with modelling collision risk tells me the risk of mortality at this site is close to zero. The independent reviewer wrote:

“Furthermore, the three years of monitoring at HMR where the Band Model was used with updated Avoidance Rates can be used to provide a quantum of the likely risk to migratory shorebirds of this proposed windfarm. Taking the size of the population of SIPO known to overwinter north of this site, reducing it by the minimum recorded decline rate (10% over 3 generations - about 20 years) recorded in the threat classification¹ and making the entirely unrealistic assumption that all of this population pass through this windfarm, it is possible to determine a likely annual mortality rate. The result is 0.27 deaths per year.

This small number is a gross over-estimate because both the field work and the bioacoustic monitors demonstrate that very few shorebirds actually cross the site and, furthermore, the orientation of the proposed turbines means they would be in line with each other in relation to the migration route and hence are more likely the equivalent of one turbine. So even if a full investigation using full daylight observations and radar had been used and results put into the Band Model, the likely outcome would be less than 0.001 predicted mortalities per year.” (Dr J Craig 2021)

- 30 I agree with Dr Craig that if occasional mortalities of SIPO do occur at this site, they will be stochastic in nature, staggered over many decades, and certainly not annually as we have predicted at other sites where thousands of SIPO movements are required each year for a mortality to occur.
- 31 The conclusion of my assessment was *“The site does not lie in a flyway for migrant birds, which are more likely to follow the coast around Taranaki or cross the Taranaki bite to the east of the site. The likelihood of occasional migrant birds crossing the site is not zero, but we consider that these will be stochastic events that cannot be predicted or modelled and will not be in numbers sufficient to be considered a risk for these species.”* The independent reviewer commented as follows:

Conclusion: The results of field work and desk top survey were appropriate and adequate for determining the risk of the proposed turbines to shorebirds. The effect will be negligible.” (Dr J Craig 2021)

- 32 In summary, it is my opinion that sufficient sampling was carried out at this site to determine whether the proposed wind farm posed a risk to migrant species. Based on my knowledge of the site and of the local landscape, I concluded that the wind farm did not pose a risk of collision to migrating birds. I stand by this conclusion.

Department Recommendations

- 33 Following from their comments on the field work, the Department recommended three years of post-construction collision monitoring during migration periods, with associated mitigation and compensation.

As such it is recommended that the applicant appropriately account for potential effect on migratory birds by developing a Bird Collision Monitoring Plan to measure the rates of bird mortality from collisions. This monitoring should be tailored around migration periods and potential bird collision for at least the first three years of the projects operation (DOC 2021).

- 34 For all the reasons discussed above I do not consider that post-construction collision monitoring is necessary for this site and I stand behind the conclusions of my assessment (Section 9.2.1) which states:

“We have considered the necessity of post-construction monitoring of bird strike at this site. It is our conclusion that, there are no species with a status of threatened or at risk that are likely to interact with these four turbines sufficiently for there to be an adverse effect on the local or national populations of those species.

We are aware that mortalities of a number of common native species will occur, but as for other wind farms that have undergone post construction monitoring, those mortalities will be of common and widespread species of pastoral landscapes, and are unlikely to occur at levels that will have local or national population level effects.”

Conclusion

- 35 It is my opinion that post-construction mortality monitoring should be justified by the data, not simply imposed by default. It is a difficult process that should not be undertaken lightly, especially if there is a reasonable expectation that the only mortalities will be of common pastoral species. I

note that in 2010 I made a recommendation not to carry out post-construction monitoring Mill Creek Windfarm for this reason (Boffa Miskell Ltd, 2008). This was accepted by the Court (ENV-2009-WLG-000060, 61, 62, 63, 65).

36 Looking at the results of my Environmental Impact Assessment, both the desktop study and field observations, I conclude that:

- (a) The site lies within 165,000 ha of continuous and largely identical pastoral land. There are no landscape features that would direct migrants to it, or habitats within it that that would encourage migrants to rest at it.
- (b) The site lies too far inland from the coast (8km) to have a n impact on coastal movements of migrants, which typically follow distinctive features, the surf, beach, coastal escarpment and coastal dunes,
- (c) The site lies some distance east of a predicted inland movement path across land from near Hawera to New Plymouth, in the vicinity of Waingongoro River (8.5km) and SH3 (10km to the east).
- (d) The site lies in the “shadow” of Mt Taranaki and so is unlikely to lie in the path for southward movement of migrants.
- (e) In January 2020, during the two weeks that are the peak for the northward migration of domestic migrants, and when up to 70,000 SIPO travel north along the west coast of the North Island (Fuller et al., 2009), one SIPO was observed crossing the Kapuni site.
- (f) The likelihood of occasional migrant birds crossing the site is not zero, but I consider that these will be stochastic events that cannot be predicted or modelled and will not be in numbers sufficient to be considered a risk for these species.

37 It is my opinion that migrant species will not be present at this site in sufficient numbers to justify post-construction collision monitoring. I consider, based on the post-construction collision monitoring at five other New Zealand wind farms (Mahinerangi, West Wind, Te Apiti, Waipipi and Te Uku) that any collisions will be of common widespread pastoral species and will have no impact on the local populations of those species.

LIZARDS

38 The submission from the Department notes that:

The application (Appendix J.1 – Ecological Assessment) notes that lizard species may be present in the hedgerows and that parts of the hedgerows will be removed as part of the project. The Ecological Assessment recommends that a lizard survey is conducted (by a suitably conducted ecologist) prior to any works, and if lizards are detected, that a lizard management plan should be prepared. The Ecological Assessment also notes that a Wildlife Act permit would be required for any lizard salvage and/ or relocation.

In reviewing the proposed conditions (Appendix O), it is does not appear that the recommendation for a lizard survey and subsequent lizard management plan, has been carried through.

It is the Director-General's view that the recommendations in the Ecological Assessment (Appendix J.1) need to be included in the conditions.

39 The Department is correct that our assessment recommended a pre-construction survey and if necessary, the development of a lizard management plan for rescue and relocation. The Applicant has sought our advice on appropriate conditions of consent. The following are standard conditions that have been accepted on other projects.

1. Upon finalisation of infrastructure plans and associated extents and locations of hedgerow and riparian planting clearance (including associated grassland), a lizard survey must be conducted in these clearance areas by a suitably qualified and experienced ecologist prior to works commencing.
2. If indigenous lizards are detected during the lizard survey outlined in Condition 1, then a Lizard Management Plan (LMP) must be prepared by a suitably qualified and experienced herpetologist to minimise effects of the project on indigenous lizards. The LMP must include (but is not restricted to) the following:
 - a. An assessment of indigenous lizards present within the site;
 - b. Methods and timing for lizard salvage and relocation, or a description of alternative mitigation measures if the project herpetologist considers salvage to be unsuitable. This should be determined in consultation with DOC;

- c. Identification of an appropriate relocation site/s (if lizard salvage and relocation is being conducted) and measures to enhance the habitat quality of the relocation site (or sites) for lizards prior to relocation, such as habitat enhancement or pest control;
- d. Any ongoing management requirements, such as post-release monitoring or pest control.

Advice note: To survey, capture, relocate, or otherwise disturb lizards, a Wildlife Act Authority (“permit”) must be obtained from the Department of Conservation.

Dated this 02nd Day of November 2021.



Stephen Andrew Fuller

REFERENCES

- Boffa Miskell Ltd. (2008). *Mill Creek Windfarm, Ohariu Valley, Wellington: Ecological values and assessment of effects* (Report No. W05173-03). Prepared by Boffa Miskell Ltd for Meridian Energy Ltd.
- Boffa Miskell Ltd. (2021). *Kapuni Green Hydrogen Project: Ecological Impact Assessment: Terrestrial Ecology, Birds, Lizards & Bats* (No. BM191082). Prepared for Hiringa Energy.
- Bull, L. S., Fuller, S. A., & Sim, D. (2013). Post-construction avian mortality monitoring at Project West Wind. *New Zealand Journal of Zoology*, 40(1), 28–46.
- Craig, J. L. (2021). *Independent Review of Ecological Impact Assessment of Kapuni Green Hydrogen Project by Boffa Miskell*. John L Craig Green Inc Ltd 26 May 2021 (p. 6). Prepared for Hiringa Energy.
- Fuller, S. A., McLennan, J., Dowding, J. E., Barea, L., & Craig, J. (2009). *Assessment of potential avian mortality at the proposed Taharoa Wind Farm, Taharoa Beach, Kawhia, Waikato*. Unpublished report to The Proprietors of Taharoa C, Department of Conservation and Waitomo District Council.
- New Zealand Wind Energy Association. (2013). *Wind farm development in New Zealand: A framework for best practice*. New Zealand Wind Energy Association.
- Southey, I. (2009). Migration in New Zealand. *Southern Bird*, 40, 9–10.

ADDENDUM 1: METHODS

Source Boffa Miskell Limited 2021. *Kapuni Green Hydrogen Project: Ecological Impact Assessment: Terrestrial Ecology, Birds, Lizards & Bats. Report prepared by Boffa Miskell Limited for Hiringa Energy.*

Section 4.4.2 Desktop Evaluation

We also looked at the location of the site in relation to possible migratory pathways (Southey, 2009), referencing again the OSNZ Atlas, and experiences from other wind farm work (e.g. Te Apiti, West Wind, Taharoa, Te Uku, and Waverley/Waipipi) to get an understanding of the sensitivity of the site.

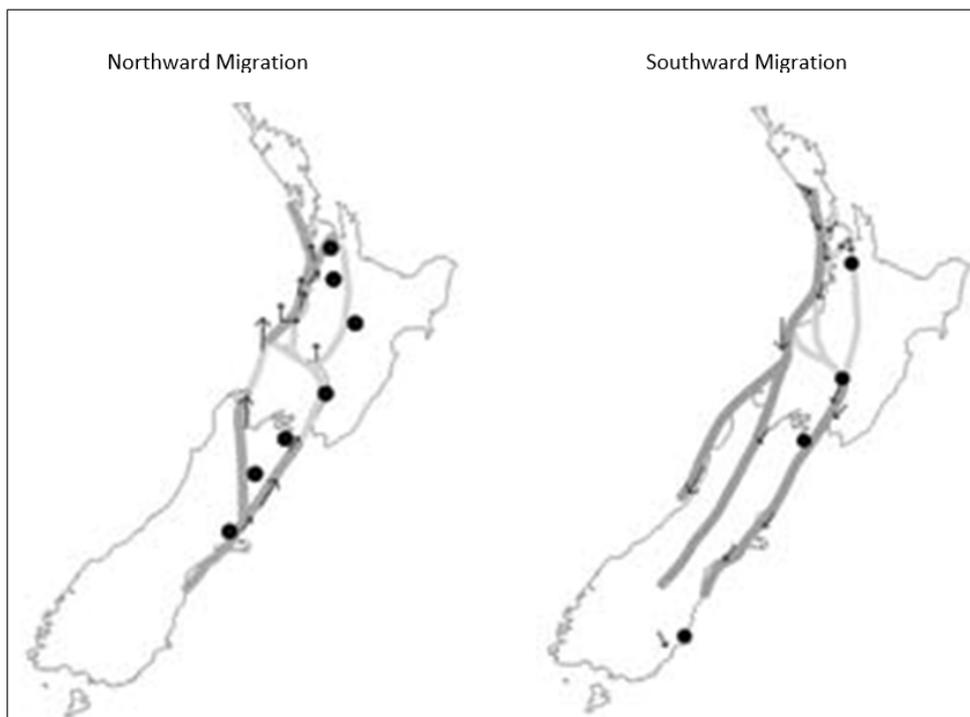


Figure 3: Predicted migration routes for national migrants (Southey, 2009).

Upon completion of this Level 1 study we concluded that there were unlikely to be any resident or local bird species with a threat status, with the likely exception of NZ pipit which are widespread on pastoral landscapes.

It was also considered unlikely that the site would lie on a flight path for domestic migrants because:

- The site lies too far inland from the coast (8km) to be affected by coastal movements which typically follow distinctive features, the surf, beach, coastal escarpment, and coastal dunes,

- The site lies some distance east of a possible shortcut movement across land from near Hawera to New Plymouth (Southey, 2009) in the vicinity of Waingongoro River (8.5km) and SH3 (10km to the east), and
- The site lies in the “shadow” of Mt Taranaki and so is unlikely to lie in the path for any likely southward movement.

However, for the avoidance of doubt it was recommended that observations be carried out during the peak northward movement of South Island Pied Oystercatcher (SIPO) in 2020. If significant numbers of migrants were observed, we would then move to more comprehensive migrant monitoring.

Section 4.4.4 Population-level studies (Level 3)

At the completion of the Level 2 study and analysis of data collected (Section 5.6), we considered whether there was a need for further site investigation, including the possible use of radar which is recommended at sites with high use of important species. We concluded that:

- The site does not lie in a flyway for migrant birds, which are more likely to follow the coast around Taranaki or cross the Taranaki bite to the east of the site. The likelihood of occasional migrant birds crossing the site is not zero, but we consider that these will be stochastic events that cannot be predicted or modelled and will not be in numbers sufficient to be considered a risk for these species.
- There was no habitat on the site that would attract or support individuals or populations of threatened or at-risk species other than those observed.
- The native birds that were present were common and widespread and we have a good understanding of the risk of collision for these species from other projects.

No further field investigations were considered necessary.

ADDENDUM 2: RESULTS

Source Boffa Miskell Limited 2021. Kapuni Green Hydrogen Project: Ecological Impact Assessment: Terrestrial Ecology, Birds, Lizards & Bats. Report prepared by Boffa Miskell Limited for Hiringa Energy.

Section 5.6.4 Incidental Observations

The only incidental observations of note were of South Island pied oystercatcher. One bird was recorded crossing the site during a fixed-point, fixed-period surveys (See Table 11). A further 36 birds were observed in three flocks heading north from the coast toward New Plymouth. A distant flock of birds (greater than 2,000 m away) was assumed to be SIPO but this was not confirmed and are not included. The distances to the three confirmed flocks from the turbine sites were estimated to be between 400 m and greater than 2,200 m away. All confirmed flocks were heading north.

ADDENDUM 3: ASSESSMENT OF EFFECTS

Source Boffa Miskell Limited 2021. Kapuni Green Hydrogen Project: Ecological Impact Assessment: Terrestrial Ecology, Birds, Lizards & Bats. Report prepared by Boffa Miskell Limited for Hiringa Energy.

Section 8.4.2 Migrants

In comparison to these other sites, Kapuni lies within an uninterrupted landscape, consisting of 165,000 ha of continuous and largely identical pastoral land. There are no landscape features that would lead birds to it, or habitats that would encourage migrants to rest at it, in preference to any other farm surrounding the site.

Notably, while there was only one observation of SIPO crossing the site, a larger number (3 flocks, 36 birds) were observed several kilometres to the east of the Kapuni site, and closer to the low pass that lies between the foothills of the Whanganui National Park to the east, and Mt Taranaki to the west, and following SH3 between Hawera and New Plymouth.

Putting this site into context we show in Table 18 migrant movements over the same January period of observation at both the Taharoa wind farm site, and a similar period of observation at the Waverley/Waipipi wind farm. Note at both sites SIPO was used as a surrogate for all migrants as they are the most visible.

Table 18. Comparison of observed activity of SIPO at Kapuni, Waverley and Taharoa in January (excluding unverified radar observations at Taharoa).

	Kapuni		Waverley		Taharoa	
	Week 1: 7-12 Jan 2020 Week 2: 13-17 Jan 2020		Week 1: 7-12 Jan 2011 Week 2: 25-31 Jan 2011		Week 1: 7-12 Jan 2008 Week 2: 13-17 Jan 2008	
	Flocks (n)	Birds (n)	Flocks (n)	Birds (n)	Flocks (n)	Birds (n)
Week 1	1	1	9	39	235	3,875
Week 2	0	0	13	104	206	3,299
Total for period	1	1	22	143	441	7,174

Overall, we conclude that this site is not an important migratory route.