Independent Review of Ecological Impact Assessment of Kapuni Green Hydrogen Project by Boffa Miskell.

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26 May 2021

INTRODUCTION

The Ecological Impact Assessment considers potential ecological effects of a four turbine windfarm near Kapuni in southern Taranaki. The proposed turbines will be constructed in exotic pasture of a dairy farm. The small size of the proposed windfarm as well as its location in a totally modified environment suggest minimal ecological risk. In contrast, a preliminary report from the Department of Conservation requests consideration of a full suite of potential risks as expected of a larger windfarm in an indigenous landscape. Green Inc has been engaged to evaluate the EIA in its own right and in relation to the DOC queries.

My review is offered in relation to my past experience (Appendix 1) which includes involvement in ecological assessments of 11 other windfarms from Otago to Northland. Information on windfarms has increased markedly in New Zealand in the last 20 years and there is a wealth of information from windfarms in other parts of the world which provide clear guidance on potential risk and avoidance.

Ecological Impact Assessment of Kapuni Green Hydrogen Project.

The assessment is based around standard techniques for evaluating ecological risk of windfarms. In addition, it uses the published guidelines for assessing the severity of ecological effects as provided by EIANZ. It is comprehensive and undertakes a full evaluation of potential risks. As expected from the desk top review, potential risks are very low and there is adequate data collection and analysis to confirm this.

There is no indigenous vegetation and DOC raise no concerns over the assessment of effects relating to vegetation or fauna other than birds and bats.

Specific questions raised by DOC

1 ***Need for full monitoring of the summer migratory period for shorebirds including South Island Pied Oystercatchers (SIPO), wrybills, pied stilt, banded dotterel, bar-tailed godwit and others.***

The assessment provides a table (Appendix F) which details the spread of migration times for the different shorebirds. At other windfarms known to be adjacent to shorebird migratory routes, SIPO have been used as the surrogate for all species. This is because they are numerous and of a size that facilitates radar tracking.

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.

The comment from DOC that doppler radar should also have been used for the full migratory season is an inappropriate request given the desk top and field results. I support the decision not to use radar. 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 classification[1] 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.

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.

2 Need for full monitoring of winter (North-South) migration of shorebirds.

This request is similar to the first one but relates to the winter or southward migration. Taking the results from Taharoa and HMR suggest that the route used in one direction is also the route used in the reverse direction. Hence the confirmation that this proposed windfarm is not on the northward migratory route is useful evidence that it is highly unlikely that it is on the route of the return migration.

The DOC enquiry suggests that the flight heights of NZ migratory species is largely unknown and there is significant uncertainty in understanding the details of north -south migrations for most species. Further, DOC suggest it is unknown whether the flight paths are similar or different in different seasons and weather conditions. This comment is not applicable to SIPO and is unlikely true for wrybill, pied stilt and banded dotterel which were all seen with SIPO flocks at HMR. While it is known that bar-tailed godwit use different routes in their northern and southern migrations to and from the Northern Hemisphere most migratory birds are known to use very similar routes on their migrations. Given the level of risk (see below) it seems unreasonable to request that Hiringa Energy should fund the pursuit of ornithological information on a desire to know basis.

Using the same entirely unrealistic extrapolation that it is the only migration route and converting the predicted mortalities from HMR would give a predicted annual death rate of 0.40 – 0.45

[1] Robertson, H.A.; Baird, K.; Dowding, J.E.; Elliot, 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. Department of Conservation, Wellington.

birds/year. This absurd scenario gives an average annual mortality prediction of 0.66. In reality, the annual rate for these proposed turbines would be less than 0.001 mortalities per year.

Conclusion: Field results in summer and a desktop exercise confirm that there was no advantage of undertaking more field work to evaluate the exceptionally low potential mortality of migrating shorebirds at any time of the year.

3 Need for a full year's monitoring of the site with observers and automatic recording devices to determine the potential use of the site by threatened bird species.

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. The summary is in Table 14.

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 Heritage[2] 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.

The Assessment also comments briefly on the spacing of the proposed turbines and the height of the RSA above the ground. These turbines have larger gaps between the RSA than is taken by the RSA and the tip of the blades at the lowest point is 69m above ground level. In my experience, most resident birds do not regularly fly at or above this height when moving around an area. Optimality Theory suggests that flying high is an avoidable cost when moving about an area. Table 19 in the Assessment affirms this prediction. Only long distant migrants such as SIPO act differently.

Australasian bittern are one species that appears increasingly in assessment concerns raised by DOC. A few bittern have been recorded making long distance movements between wetlands. The area of the proposed windfarm has no wetlands suitable for bittern and hence there is only a risk if this species frequently traverses this site when going between other wetlands. Given that all of the surrounding area is exotic grassland used for dairy farming, it is unlikely that bittern would be seen in this area or traverse it frequently. That it has not been seen in this grid square in the bird Atlas confirms the risk is negligible.

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

Conclusion: The desktop exercise and the field observations are entirely appropriate for dealing with this concern. There is little likelihood of any of the named threatened species being at risk of generating an adverse effect of the proposed windfarm.

4 Need for bat monitoring for at least a month as remnant habitat near the site may support bats.

Bat monitoring was undertaken in October and early November over 29 nights. Thirteen of these nights met the criteria as suitable for bat activity. Bats do move between areas and do feed away from forest – scrub vegetation. Use contours in terms of distance from vegetation are known and unless the proposed turbines are within 50m of such vegetation, they are unlikely to be affected. Occasional flights to 200m are known. As expected with no suitable vegetation in the area, no bat activity was detected at the site of the proposed turbines.

The assessment provides a map (Appendix D) of known bat survey locations for bats in the extended area. None are known near the site which likely explains why none were detected.

Conclusion: From the desktop study and field results, it is clear that the proposed windfarm offers no tangible risk to native bats.

Overall comment:

The assessment of potential ecological impacts is thorough and comprehensive. The site is truly unremarkable from an indigenous flora and fauna perspective. It is repeatedly sown, highly fertilised exotic pasture with some exotic hedge rows. It is surrounded by a landscape of the same. Open country birds do use the site although the majority of species present are not native.

Concerns at future windfarm developments should relate to the scale of the development and the ecology of the site rather than being a uniform enquiry. This proposed windfarm is small, being only four turbines. Turbines are known to kill birds and bats and results from other windfarms show similar patterns. The Assessment provides numbers of birds killed in the only published study from a windfarm with many more turbines. The expected deaths of a small number of common species such as Australasian harrier, black-backed gull, spur-winged plover, magpies and finches plus an occasional duck are of no threat to any threatened species or even local population. No effect on migratory birds is likely. Bats were not expected or detected and are not considered at risk at the proposed wind farm.

The assessment concludes that there are no significant effects expected and as a consequence there is no need for avoidance or mitigation. I concur with this conclusion.

I have reviewed the documentation of proposed changes in the hub height of the turbines and how this may affect birds and bats. The changes are minor and do not change my assessment.

Appendix 1: **JOHN LAURENCE CRAIG**

Education:

1990	Cert. General Management	Auckland University.
1975	Ph D	Massey University
1970	B Sc (1st Class Hons)	Otago University

Roles:

Current: Director, Green Inc Ltd - Environmental & Honey consultancy
Chair, Kiwi Coast Trust – Northland biodiversity group
Trustee, Chelsea Trust – Auckland Park sponsors
Member Advisory Board, Encounter Solutions – environmental electronic

Past:

Management Professor of Environmental Management, University of Auckland
Deputy Dean of Science, University of Auckland
Board, Metrowater Ltd – Council water company
MD, Tahi Estate Ltd – ecological retreat & honey company

Biodiversity Co-designer of Tiritiri Matangi Open Sanctuary Restoration
Involved in draft plans for Motuora, Motutapu-Rangitoto, Motuihe Islands
Member, Design Team, Waiatarua redevelopment
Member, Auckland Conservation Board
Member, Stitchbird Recovery Team
Researcher, wrybill & SIPO breeding on Rangitata River

Publications 104 refereed papers, 2 books edited, 68 other publications

RMA hearings & Environment Court cases (recent)

Effects of reconstruction of historic wharf, Mangawhai
Effects on birds of WCO on Ngaruroro River, Hawkes Bay. For HBRC.
Effect of windfarms on birds: (Puketoi, Mahinerangi, Taharoa C[3], Turitea, Hauāuru Mā Raki[4] and Blueskin Bay) + 4 others (2 current).

Awards:

2012	Officer of New Zealand Order of Merit for services to conservation
2009	Companion of North Shore City
2008	Life Membership of New Zealand Ecological Society
2001	Charles Fleming Medal for environmental achievement, RSNZ
1999	Distinguished Achievement Award, Society for Conservation Biology (*for extraordinary leadership in the application of conservation biology to New Zealand's conservation challenges*)
1997 - 2000	LINK Fellowship, British Council
1990	International Ornithological Committee (fellowship, restricted to 250 worldwide)

[3] 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.

[4] Craig, J, Kessels, G, Langlands, P & Daysh, S. 2015. Planning for net biodiversity gains: A case study of Hauauru ma rak Wind Farm. In; Hull, C, Bennett, E, Stark, E, Smales, I, Lau, J & Venosta, M. Wind and Wildlife: Proceedings of the Conference on Wind Energy and Wildlife Impacts, October 12, 2012, Melbourne, Australia. Springer, New York. Pp 69-91.