BEFORE AN EXPERT PANEL **FTAA-2508-1100**
THE POINT SOLAR FARM

Under the **FAST-TRACK APPROVALS ACT 2024**

In the matter of an application for resource consent approvals for The Point Solar Farm

By **Far North Solar Farm Ltd**
Applicant

COMMENTS ON NEW BIRD INFORMATION IN RELATION TO THE POINT SOLAR FARM APPLICATION

RACHEL KATHERINE MCCLELLAN

12 June 2026

Royal Forest and Bird Protection Society of New Zealand Incorporated
Solicitor acting:
T Williams
Email: [redacted]

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Introduction

1. My full name is Rachel Katherine McClellan.

2. I have been asked by the Royal Forest and Bird Protection Society to provide comment on new bird information provided by the Applicant for The Point Solar Farm, Mackenzie Basin. I have previously provided a statement of evidence on freshwater birds for this application (dated 19 February), and comments on new survey information and the draft Avifauna Management Plan for The Point (dated 27 February), both for Forest and Bird.

3. I have also provided a statement of evidence on freshwater birds for the proposed Haldon Solar Farm (dated 2 February 2026), and comments on a new assessment for Haldon Solar Farm (dated 24 April 2026), for which I reviewed RMA Ecology's Haldon Solar RFI Response: Avifauna effects assessment (dated 3 April 2026), both for Forest and Bird.

4. My qualifications and experience are as set out in my evidence dated 19 February 2026.

5. Specifically, my comments relate to bird matters contained within the Expert Panel's Request for Information 5, the Applicant's response dated 29 May 2026, and the draft avifauna compensation options (Attachment 3).

6. I have also reviewed Gerry Kessels' assessment of Critical Information Gaps – Avifauna (dated 11 March 2026), Dr John Craig's assessment of the potential effects of The Point Solar Farm on birds (Green Inc., dated 30 June 2024), and Dr Gary Bramley's review and advice (ecoLogical Solutions, dated 1 July 2024).

Updated ecology information and remaining deficiencies

7. The Expert Panel for The Point Solar Farm requested the following information on birds (summarised):

    i. A species specific collision risk assessment for all Threatened and At Risk species using or traversing the site, and actual, not theoretical collision risk exposure.

    ii. Technical assessment of the proposed solar array including evidence for reduction in collision risk of proposed anti-reflective coatings, stowing positions, and panel spacings.

    iii. Assessment of bird collision and electrocution risks from non-panel infrastructure.

    iv. Detailed carcass monitoring methodology capable of detecting mortality of Nationally Critical species.

v. Population viability analysis for Threatened and At Risk species.

I will address each of these topics in turn.

Species specific collision risk assessment

8. The Applicant states in the RFI-5 response (Section 3.3.1) that "a detailed species specific collision risk assessment has already been addressed in the Wildlands Draft Avifauna Management Plan (6621h-i, April 2026, particularly Sections 4-6)". However, this iteration of the document is not on the Fast Track website, and I have not been able to view it. I previously reviewed an earlier iteration of the draft Avifauna Management Plan dated March 2026 for the Expert Panel, and it does not contain a species specific collision risk assessment. I note that there is yet another version online, also dated March 2026, but with tracked changes. This version also does not have a species specific collision risk assessment. However, I refer to this latter document in these comments.

9. The Applicant also refers to Dr Gary Bramley's "Final Statement of Evidence – Ecology" regarding species specific collision risk assessment. This also does not appear to be on the Fast Track website.

10. The Applicant notes that the expert reviews by Dr Bramley (July 2024) and Dr John Craig (June 2024) (Appendix T – Bird Strike Reports) supported Wildland Consultants draft Avifauna Management Plan. This is incorrect; both Dr Bramley and Dr Craig only reviewed the original Assessment of Ecological Effects (Report No. 6621c, dated May 2023) which was limited to a few lines on the potential for collisions with panels (p.31).

11. I agree with the Applicant for The Point and RMA Ecology, for Haldon, that there is a lack of site specific quantitative data for both sites that could demonstrate bird use of the sites, flights adjacent to or over the sites, and at what heights birds are flying, both during the day and at night. What is available are data on tarāpirohe | black-fronted terns which show extensive traversing of the proposed site for The Point, and a major overnight roost site used by hundreds of terns within a few hundred metres of both proposed solar installations.

12. There remains a lack of data for the remaining five Threatened and eight At Risk species. I also agree with the Applicant and RMA Ecology that we are therefore reliant "on a qualitative, precautionary assessment" (RFI-5 response).

13. The Expert Panel has highlighted the inadequacy of the additional flight observations undertaken by Wildland Consultants in February 2026 in the RFI-5. I also referred to this in my comments to the Panel (dated 27 February 2026). Nevertheless, the Applicant has referred to it again, noting that "no core Threatened braided river bird species [were] observed flying through the panel interaction zone". That is inevitable

given it was out of the breeding season and black-fronted terns, pohowera | banded dotterel, tarāpuka | black-billed gull, ngutu pare | wrybill, and tōrea | South Island pied oystercatcher are absent from inland habitats in February. Kakī |black stilt are present; however, 12 15-minute flight observation surveys cannot provide useful information for such a rare species.

14. The Applicant refers to "potential nocturnal movements for species such as black-fronted tern". Three studies of terns carrying GPS transmitters show hundreds of nocturnal movements of black-fronted terns, adjacent to, and traversing the proposed site[1,2,3]. These are not potential movements; they are actual movements.

15. The Applicant states that Dr Bramley and Dr Craig have addressed species-specific vulnerability factors (body size, flight behaviour, habitat requirements, polarised light sensitivity) in their reviews (Appendix T-Bird Strike Reports]. They did not.

16. The Applicant states that both Drs Bramley and Craig noted the lack of empirical support for the Lake Hypothesis – whereby birds mistake the solar installation for a waterbody. I also discussed this (in most detail in my evidence for Haldon, dated 24 April) and agree with them. Most birds found dead in solar farms overseas are not waterbirds (see Figures from Kosciuch *et al.* 2020[4] and discussion of the review by Kosciuch *et al.* 2025 in my evidence above[5]). Which begs the obvious question, why *are* birds colliding with panel infrastructure? This is the essence of the problem at hand – scientists do not know the casual factors underlying collisions with panels.

17. Regarding the uncertainty surrounding collision risk, bird experts for The Point and Haldon have stated the following:

    a. Dr Gary Bramley: "The reason why birds collide with solar panels remains unknown" (p.12). And "…whilst any potential negative effects on birds remain highly uncertain, based as they predominantly are on international studies of solar farms deploying different technology in strikingly different ecological contexts. Furthermore, the impacts of solar farms reported in the literature have ranged from positive to negative and there are no New Zealand data yet to inform such an assessment" (p.15). And in his conclusion: "The potential

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2 Gurney F.E. 2022: Breeding movements and post-breeding dispersal of black-fronted terns/ tarāpirohe (*Chlidonias albostriatus*) in the Mackenzie Basin. Master of Science, Lincoln University. 87p.

3 O'Donnell C. 2024: Initial briefing – potential impacts of proposed 'The Point' solar farm near Twizel on threatened birds. Department of Conservation unpublished report.

4 Kosciuch K., Riser-Espinoza D., Gerringer M., Erickson W. and Zhang J. 2020: A summary of bird mortality at photovoltaic utility scale solar facilities in the Southwestern US *PLoS One 15* e0232034.

5 Kosciuch K., Riser-Espinoza D. and Mitchell M. 2025: Lake effect or data mirage? How accounting for technology differences at utility scale solar energy facilities can change data interpretation. *Environmental Research Letters 20*: https://doi.org/10.1088/1748-9326/ae1e91.

for collision related mortality remains unknown and the level of risk that this presents to the birds living in the area remains uncertain because no directly comparable situation has been studied to date".

b. Dr John Craig: "Collisions with panels is the largest unknown. As Drs Bramley and O'Donnell point out, the reason for apparent collision mortalities is poorly understood."

c. Jeroen Lurling with Dr Graeme Ussher (RMA Ecology – Haldon RFI response, Section 3.1.2 Management of uncertainty): "Accordingly, uncertainty remains high."

18. Dr Bramley and RMA Ecology have provided qualitative species specific collision risk assessments.

19. As I have mentioned, though the Applicant states that Wildland Consultants also undertook such an assessment for The Point, I have not been able to locate it. The Draft Avifauna Management Plan (Wildlands Report No. 6621h-i, dated March 2026) refers to a detailed discussion of effects in the Assessment of Environmental Effects (Wildland Consultants 2025, Report No. 6621c). The Applicant refers to "collision risk for the key threatened species as uncertain but generally low to moderate in the site context", and references "Wildlands Avifauna Assessment, 3 April 2026". I cannot find either of these documents on the Fast Track website.

20. The most recent assessment of potential effects undertaken by the ecologists for The Point that I have found is in the updated Substantive Application dated 25 August 2025, Section 6.14.2, Table 12. In this table, risk of bird strike is one of four potential or known effects assessed, and the level of effect is given as "Minor (subject to visual markers on solar panels included as a mitigation measure)". A qualifying comment is included: "It is noted that there is a lack of international and local information on the potential bird strike risk. Glare off the reflective surfaces of PV solar panels can create an attraction to birds (e.g. pond [sic] effect) and disorientation, especially when they are installed in large quantities on solar farms. Refer to Bird Strike Memo in Appendix T. Mitigation measures, such as having visual makers [sic] on the solar panels, is understood to reduce the risk of bird strike. This has been included by the Applicant." I do not place much weight on this basic assessment.

21. Dr Bramley's assessment for The Point (Table 1) estimated that the species with the highest potential for collision (without mitigation) were the obligate waterbirds pārea | grey duck, pūteketeke |Australasian crested grebe, māpunga | black shag, and kawaupaka | little shag (**moderate**), despite having stated that the Lake Hypothesis has little empirical support. Potential risk for all other species was assessed as either **small** or **negligible**. South Island pied oystercatcher was assessed with a '?' which was unexplained in the text. With mitigation, all effects were assessed as less than minor

or positive, except for the shags. Dr Bramley does not explain the justification for his assessments of collision risk in his memo.

22. RMA Ecology provide by far the most detailed and well explained qualitative species specific strike risk assessment and take into account the high levels of uncertainty (Sections 3.1.2 and 3.1.3). They have used Environment Institute of Australia and New Zealand (EIANZ) guidelines to determine levels of effect[6]. Nevertheless, I have concerns with their assessment, and I discussed these in detail in my comments to the Haldon Expert Panel (24 April 2026; paragraphs 54-65). Though the assessment was undertaken for the proposed Haldon Solar Farm, I consider it to be generally relevant to The Point given the proximity of the proposed sites to each other and to the adjacent Important Bird Areas.

23. As I discussed in that evidence, Lurling and Ussher have become confounded by the relative importance of the Lake Effect hypothesis. Though they note that there is little evidential support for the Lake Effect hypothesis, they state "Species with higher potential photovoltaic collision risk are those that combine low-altitude flight and with frequent movement across or adjacent to the site and behavioural association with water-like visual cues, and high-speed water landings or diving". Given most overseas mortalities are of bird species that do not associate with water, there are clearly other mechanisms at work that RMA Ecology have not considered. For example, the polarisation trap caused by solar panels that is known to attract aquatic invertebrates, differential effects of polarised light between bird species, or simply, the addition of several hundred thousand solar panels into an open landscape leading to incidental collisions (e.g. at night, or when visibility is poor).

24. This aside, in summary, RMA Ecology have assessed the residual level of effects (after mitigation) as **Low-Moderate** for:

    - Kōtuku | white heron – Nationally Critical
    - Matuku-hūrepo | Australasian bittern – Nationally Critical
    - Kakī – Nationally Critical
    - Black-fronted tern – Nationally Endangered
    - Pārera | grey duck – Nationally Vulnerable
    - Taranui | Caspian tern – Nationally Vulnerable
    - Pūteketeke | Australasian crested grebe – Nationally Vulnerable.

25. This amounts to the potential for a significant level of adverse effects on seven Nationally Threatened species, assuming mitigation actions in fact work.

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[6] Roper-Lindsay J., Fuller S., Hooson S., Sanders M. and Ussher G. 2018: Ecological Impact Assessment (EcIA) – EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems, 2nd Edition. Environmental Institute of Australia and New Zealand, Melbourne, Australia.

Mitigating the risk of collisions with panels

26. The Expert Panel has requested evidence on the effectiveness of panel and array design at reducing collisions. However, this is not possible as no research has been published on the subject (as discussed in my evidence on both Haldon and The Point solar farms).

27. No studies have been undertaken that investigate the effectiveness of anti-reflective coatings at reducing collisions with panels. Dr Bramley also notes this in his review. Dr Bramley mentions UV-reflective coatings, but presumably this would be inappropriate for solar panels.

28. The solar installation will have wide spaces between rows of panels, which is thought to address the theoretical Lake Effect. The theory is unlikely to be a primary cause of collisions. Its efficacy at reducing collisions is also unstudied.

29. Recent reviews have shown that facilities using tracked panel rather than the older technology fixed tilt panels are likely to cause less collisions (previously discussed in my evidence); however, modern facilities still cause mortality[7,8]. There are no data on collision reduction from stowing panels at 60 degree angles or vertically overnight, or that demonstrate if vertical positioning is better than angled.

30. Dr Bramley provides a discussion on deterrents. I have several concerns regarding the use of deterrents.

31. Firstly, it is highly plausible that collisions could occur at night, and many of the species present in and around the site make nocturnal movements; qualitative data shows high levels of nocturnal movements of black-fronted terns, for example. It is not clear to me that acoustic and visual deterrents have been tested widely at night, or during times of poor visibility or high winds.

32. Secondly, deterring Nationally Threatened and At Risk bird species from using 700 ha of terrestrial habitat for breeding and foraging causes adverse effects which have not been addressed by the Applicant.

33. Thirdly, the proposed site is within a few hundred metres of the Lower Takapō River, the Takapō Delta, the Twizel River, and the Ōhau C ponds complex where 14 Nationally Threatened and At Risk species are known to occur. It is not appropriate to stop bird species from being able to use the terrestrial habitats that are physically

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[7] Kosciuch K., Riser-Espinoza D., Gerringer M., Erickson W. and Zhang J. 2020: A summary of bird mortality at photovoltaic utility scale solar facilities in the Southwestern US *PLoS One 15* e0232034.

[8] Smallwood K.S. 2022: Utility-scale solar impacts to volant wildlife *Journal of Wildlife Management 86:* doi.org/10.1002/jwmg.22216.

connected to this Important Bird Area. The site is so close that acoustic deterrents could potentially be detected by birds within the rivers and wetlands.

34. Lastly, deterrents have not been tested on species such as kakī, black-fronted tern, and banded dotterel, and we do not know if they will be deterred from the site, acclimate, or possibly avoid an even larger area than intended.

35. The draft Avifauna Management Plan (Section 7.6, Wildland Consultants 6621h-I, March 2026) states that "During monitoring, the effectiveness of these mitigation techniques [panel array spacing, standard anti-reflective coated front glass, 55-degree stowing position at night] should be assessed to see how birds are using the spacing between panels, and that the anti-reflective coating is less attractive to birds". This statement summarises the section on reducing the risk of impact trauma. This is hardly scientific and is far from being a credible assessment of the reduction of collision risk.

36. In summary, no data are available that can inform the Expert Panel on the effectiveness of the proposed solar arrays at The Point at reducing the probability of collisions. Critically, if collisions for any species exceed thresholds, there are no known effective options to address mortality.

Collisions with other infrastructure

37. The Expert Panel has requested information the collision and electrocution risks posed by other infrastructure at the site.

38. In the most recent iteration of the draft Avifauna Management Plan, these risks are not listed as one of the five potential effects (Section 6.0, Wildland Consultants 6621h-i, March 2026). However, in the description of the carcass monitoring programme, fencing, substations, buildings, lighting, and above-ground cabling are all highlighted as "infrastructure risk areas" (Section 7.12.2).

39. I point to RMA Ecology's report – Section 4.2 Mitigation, for mitigation recommendations for electrocution, and collision with the perimeter fence and transmission lines, for guidance.

40. However, in my opinion, the panels (stated in Dr Bramley's review as amounting to 736,000 in number) provide a far greater collision risk.

Carcass monitoring methodology

41. The Expert Panel has requested detailed carcass monitoring methodology capable of detecting the mortality of Nationally Critical species.

42. I discussed the significant deficiencies in the methodology set out in the draft Avifauna Management Plan at length in previous evidence. The most recent version of the plan, with tracked changes, addresses previous omissions such as carcass persistence and searcher efficiency trials, and has considerable extra detail. However, in my opinion, the methodology remains insufficient and is yet to be finalised as it requires the development of an Avifauna Carcass Monitoring Programme. Consequently, I cannot comment on a final method.

43. The plan lacks a monitoring objective. As I have previously said in evidence, the protocol for carcass monitoring must have the detection of a single kakī as its focus. This is appropriate as the trigger level for Nationally Critical species has been set at one individual – indicative of the significance of a single death. The programme must be able to detect this death, if it should occur.

44. Risk-stratified sampling is insufficient and the assessment of areas of high risk is entirely subjective in this situation.

45. I am very supportive of the involvement of a biostatistician in the development of such a programme. For Haldon Solar Farm, I reviewed the biostatistical report produced for the Applicant by Proteus[9]. Proteus was not provided with an objective for the monitoring programme, noting, for example, that "…identification of which bird sizes are of the most importance for detection will aid in developing a suitable monitoring design". They undertook modelling of scenarios in the absence of ecological guidance from the Applicant.

46. For example, in their Table 3.2, they summarise that for a situation where there is a low rate of carcass detection (in their example, 10 birds per size class per year), for small birds, where fatality surveys are undertaken every four days, and 50% of the site is surveyed each iteration, this will meet the standard of 0.8 (80%) probability of documenting mortality after one year of monitoring.

47. It is clear to me that an even more intensive fatality monitoring protocol will be required for a scenario where a single individual of a single species must have a high probability of detection. This is why I have recommended for both The Point Solar Farm and for the Haldon Solar Farm that the whole site is searched within a timeframe that minimises the potential loss of a dead kakī through scavenging, predation, or decomposition, and also the reason why I have recommended the use of dogs in previous evidence, which are known to have much greater searcher efficiency rates than humans.

[9] Hamlin T.J., Jones T.T. and MacKenzie D.I. 2026: Statistical advice for a solar power installation at Haldon Station, Canterbury, New Zealand. Report for Lodestone Energy, Proteus Client Report: 219. Proteus, Outram, New Zealand.

48. I remain in disagreement with the protocols for managing carcasses that are found. International publications on the rates of bird collisions with solar panel infrastructure regularly refer to proportions of carcasses that are not identified to species and/or where the cause of death is unknown. Likewise, critics of collision rate estimates point to these issues. The people involved in carcass searches may not have expertise in identifying carcasses from feather spots or determining the presence of internal trauma in the field, for example. Results from carcass monitoring should not be contentious, and to that end, all carcasses should be collected and sent for independent autopsy to determine cause of death, which will allow for DNA identification if required. The draft protocol presently states that a carcass for which the cause of death cannot be determined in the field will only be sent for autopsy if sufficiently intact. I am not convinced that decision should be left to the surveyor.

49. The trigger levels set out in Section 7.13.3 are appropriate. However, the subsequent review, if thresholds are met, should not be to determine if further effects management is needed as is presently stated. Further mitigation is an inherent requirement in the triggering of the review.

50. I reiterate, if mortality thresholds are triggered, there are no tested mitigation options that could be implemented to confidently reduce collisions with panels. The Avifauna Management Plan provides the alternative option of more compensation; I discuss this later.

Population viability analysis

51. The Expert Panel has requested population viability analyses. I undertook such an analysis for black-billed gulls in Southland as part of my PhD research[10] and understand the data requirements. The Department of Conservation would likely hold data that could be used for population viability analysis for several species, but such data are not readily available publicly.

52. In the absence of such data, I made the assertion in my original evidence that even the deaths of small numbers of Nationally Threatened bird species could have regional and national population effects. Ongoing deaths of one or two kakī annually – in particular, adults – will likely impact population stability. Numbers of Australasian bittern are lower than kakī in the Mackenzie Basin, and individual deaths could potentially lead to regional decline. Even black-billed gulls, common in lowland Southland and Canterbury, only number a few hundred in the Mackenzie Basin. Dr Bramley states “Given the threatened and at risk status of the species present near The Point, additional mortality could be sufficient to cause a population decline for one or more of the species present” (p.11).

[10] McClellan R.K. 2009: The ecology and management of Southland’s black-billed gulls. PhD thesis in Zoology, Otago University. 264p.

Compensation

53. The Avifauna Compensation Strategy is the basis for the Applicant's assertion that there will be no residual adverse effects of the proposed solar farm on birds. Of the four components, the proposed predator control in the Godley and Cass rivers has the potential to directly benefit kakī, black-fronted tern, banded dotterel, and black-billed gull. The RFI-5 response states that the effectiveness of this measure is supported by existing long-running Department of Conservation programmes, noting that the wild adult population of kakī has increased from a low on 23 adults in 1981 to approximately 143-170 adults in recent years. This does not reflect the whole story.

54. In my second brief of evidence for the Haldon Solar Farm, I highlighted the precariousness of the situation for kakī and reproduced a section from BirdLife International's analysis of the species' threat status, and I repeat it here. BirdLife International is designated by the IUCN as the Red List Authority for birds and is responsible for regularly assessing the extinction risk of the world's *c*.11,000 bird species. Kakī is classified as Critically Endangered as the number of individuals is estimated to fall within the 1-49 mature individuals band (year of estimate 2024). The following excerpt extensively quotes Dr Richard Maloney, Department of Conservation principal scientist.

- **Population information**

"The population was 129 birds in 2019 (R. Maloney in litt. 2020) and 162 birds in 2021 (Robertson et al. 2021). As of August 2023, the population numbered 156 birds (Department of Conservation 2023). The majority of the adult population is derived from captive-reared birds, of which high numbers are released annually (154 released in 2021, Bourke et al. 2022). However, survival of released individuals is low, highlighted by the continued low resulting adult population, and re-introduced individuals must have produced viable offspring before they are counted as mature individuals. There are very few breeding pairs: since 2013 numbers have fluctuated between 17 and 29 pairs, compared with 4 in 1999 (R. Maloney in litt. 2020). Adult mortality remains very high due to intense predation pressure and very few produce viable offspring without management: in 2019 only 5 birds in the population could be considered hatched and raised in the wild (R. Maloney in litt. 2020), the rest derived from captive-reared and released subadults and juveniles. The number of mature individuals is therefore uncertain but considerably smaller than the total adult count and is placed in the band 1-49 mature individuals[11]."

55. In my opinion, it is a stretch to assume that the kakī population is continuing to increase. It could be said that in the last couple of years the population has been

[11] https://datazone.birdlife.org/species/factsheet/black-stilt-himantopus-novaezelandiae

relatively stable, albeit fluctuating; however, BirdLife International classifies the population trend as 'Unknown'.

56. As part of the Waitaki Power Scheme reconsenting process, NIWA undertook a major statistical analysis of all freshwater bird species found in all major rivers in the Waitaki Catchment for Meridian Energy, using data from 1962 to 2021[12]. In the Tasman River valley, where the Department of Conservation has been undertaking predator control to protect braided river bird species for over 20 years, the analysis showed no increase in kakī numbers, or in any other river (graphs from Whitehead *et al*. 2023 are reproduced in the Appendix).

57. For black-fronted tern, predator control in the Tasman River *has* resulted in significant increases. But in the Ōhau River, where the Department of Conservation has been undertaking intensive predator control to protect the colony nesting on Tern Island for over 15 years, the population has declined (Appendix).

58. My point is that providing the Department with $595,000 over approximately seven years for predator control in the Godley and Cass rivers provides no guarantee that mortality of kakī or any of the braided river bird species caused by the solar farm can be offset. It most certainly does not address potential mortality of Australasian bittern, kōtuku | white heron, Australasian crested grebe, or any of the other Threatened or At Risk species.

59. If fatalities are ongoing, which is entirely plausible given there are no tested methods for mitigation, then after approximately seven years, there will be no offset for ongoing deaths.

60. In summary, the Applicant has not provided evidence that the Avifauna Compensation Strategy can offset the potential impacts of the solar farm on the 14 Threatened and At Risk bird species present in and around the site for the term of the consent.

Conclusion

61. The proposed site of the Point Solar Farm is next to nationally and internationally important bird habitats that support six Nationally Threatened and eight At Risk bird species. One of these is kakī, one of the world's rarest birds and largely restricted to the Mackenzie Basin.

[12] Whitehead A., Hoyle J. Bind J. and Sykes J. 2023: Freshwater birds and riverbed vegetation in the Waitaki catchment – Current state of knowledge. NIWA Client Report No. 2020122CH. Prepared for Meridian Energy. 171p. Data analysis involved quasi-poisson generalised linear models (sub-catchments) or a quasi-poisson generalised mixed effects model (Waitaki catchment).

62. All 14 species will fly adjacent to the site, most will traverse the site, and some do so on a regular basis. Key braided river bird species are expected to nest and/or forage at the site.

63. Experts are agreed that causal mechanisms underlying panel collisions are unknown and significant uncertainty surrounds the potential level of impacts for any of these species. Qualitative analysis of collision risk subsequently has a wide margin of error; in the worst case scenario, significant adverse effects on regional and national species populations such as kakī and Australasian bittern may occur.

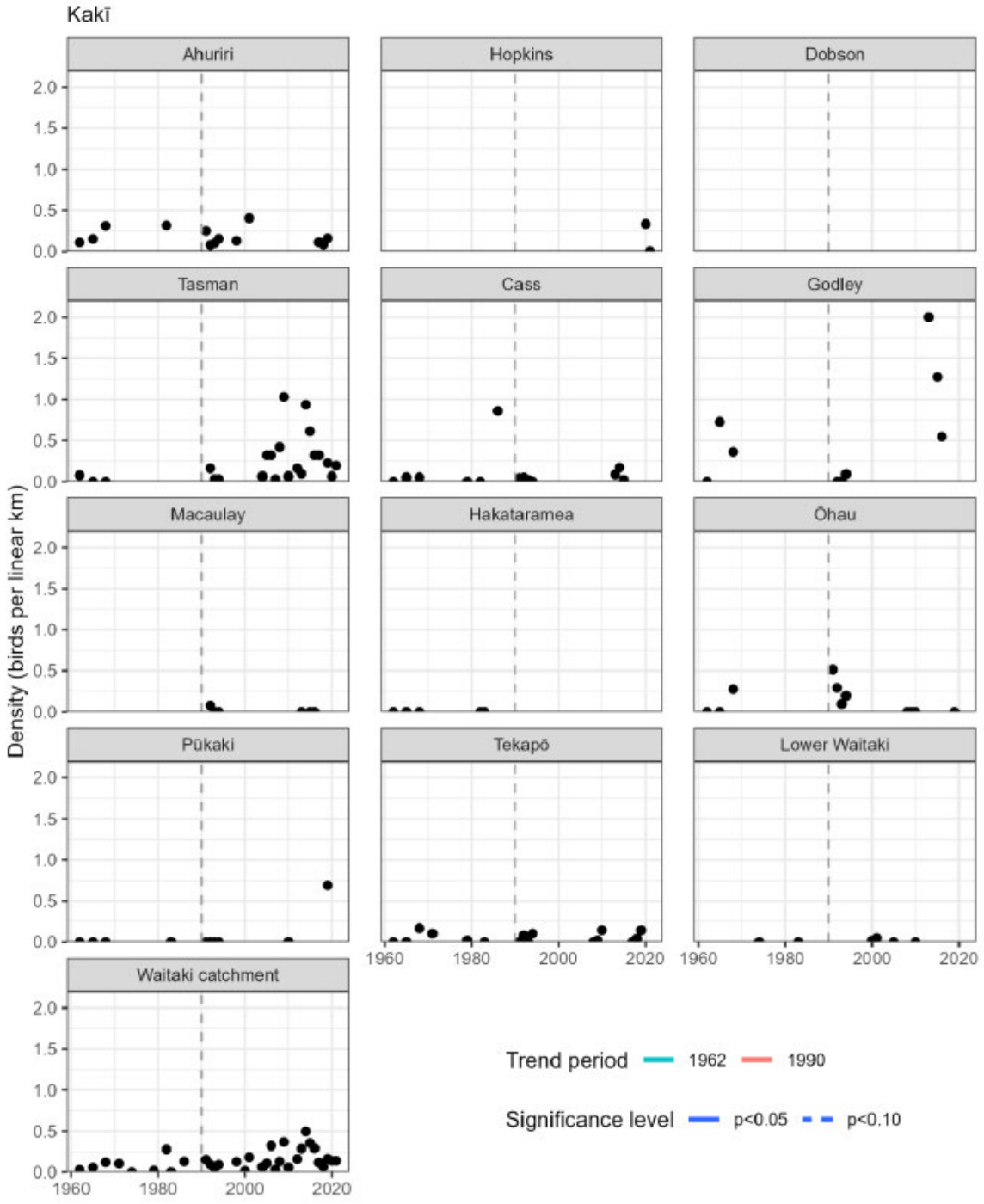
64. The cascade of uncertainty is plain to see:

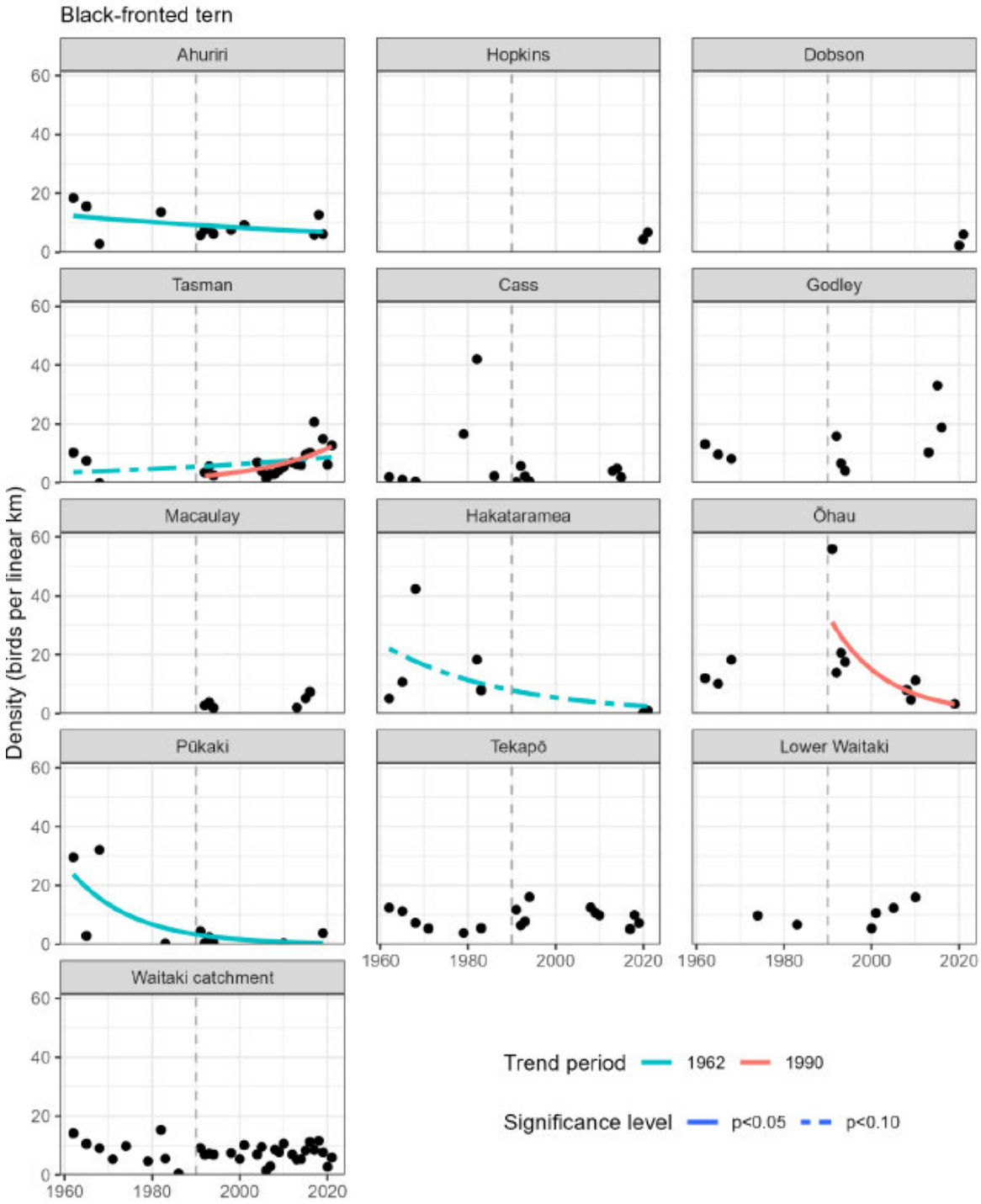
- High uncertainty exists regarding the extent of collision risk.
- Detecting the mortality of single individuals of extremely rare species such as kakī within the site is fraught, and presently unaddressed by draft protocols.
- No panel or array design mitigation measures have been tested internationally for their efficacy at reducing collisions, and the utility of deterrents is largely unknown and questionable for the Threatened and At Risk species present.
- Consequently, there is no guarantee that management responses exist that can address mortality if thresholds are triggered.
- No evidence has been provided to demonstrate that the proffered compensation package will offset mortality of braided river bird species, and the package does not address all potentially affected Threatened and At Risk species. Ongoing adverse effects will not be offset.

Rachel McClellan
12 June 2026

Appendix

Points represent counts per year from spring formal river surveys, standardised by survey length, for each sub-catchment and the whole Waitaki catchment (lower left panel). Zero values indicate the species was not observed in a given year. Coloured lines show significant population trends ($p < 0.05$ solid line; $p < 0.10$ dashed line) based on time periods from 1962–2021 (blue) and 1991–2021 (red), calculated using quasi-poisson generalised linear models (sub-catchments) or a quasi-poisson generalised mixed effects model (Waitaki catchment). The vertical grey dashed line indicates the start of the current consenting period.




Black-fronted tern
Ahuriri
Hopkins
Dobson
Tasman
Cass
Godley
Macaulay
Hakataramea
Ōhau
Pūkaki
Tekapō
Lower Waitaki
Waitaki catchment
Density (birds per linear km)
0
20
40
60
1960
1980
2000
2020
Trend period
1962
1990
Significance level
p<0.05
p<0.10