

Appendix 6: Technical Advice – Avifauna by Jean Jack

Date	21 August 2025
To	Susannah Black, Principal Consents Planner, Environment Canterbury
From	Dr Jean Jack, Team Leader Land Ecology, Environment Canterbury
Project advice provided for	Genesis Tekapo Power Scheme Renewal
Documents referred to	1. Appendix Q Avifauna Takapō Power Scheme Reconsenting; Assessment of Ecological Effects – Avifauna. Prepared for Genesis Energy Limited by BlueGreen, dated 3 April 2025. 2. Appendix D (Updated 25 July 2025): Proposed resource consent conditions. Appendix D (Updated 25 July 2025): Proposed resource consent conditions (PDF, 410KB) 3. Amended Appendix E Proposed Consent Condition Plans for Takapō Power Scheme Reconsenting, dated 29th May 2025 (Includes the draft Kahu Ora strategic action plan for the compensatory Indigenous Biodiversity Enhancement Programme (IBEP).
Qualifications	My principal qualifications include PhD (Ecology) (2011), Post-graduate Certificate in Environmental Management from Lincoln University (2024), and a Bachelor of Commerce & Administration from Victoria University (2004). My current role at CRC is Team Leader of Land Ecology within the Science Group. I have been working at the Council since 2011.
Code of Conduct	I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This technical report has been prepared in accordance with that Code. In particular, unless I state otherwise, the opinions I express are within my area of expertise, and I have not omitted to consider material facts that might alter or detract from the opinions that I express.

Executive summary/overview

1. This memo provides technical advice on the Fast Track application made by Genesis for the Tekapo Power Scheme (TPS), regarding the actual and potential effects on freshwater bird species (avifauna) and the management of those effects.
2. The application¹ provides a comprehensive description of avifauna values and so I do not repeat that here.
3. Potential effects include the ongoing impacts of the initial habitat loss from the scheme's establishment, and the potential effects of the continued operation of the TPS on freshwater avifauna.
4. Areas of agreement with Genesis and the benefits of the project for avifauna are acknowledged, while focusing on outstanding matters of significance. These matters relate the proposed effects management approach – which has significant implications for the management of effects on avifauna.
5. Central to assessing the adequacy of the effects management package proposed by Genesis is determining whether effects should be addressed sequentially in accordance with the effects management hierarchy, and whether any compensation package should incorporate offsetting principles such as equivalency and commensurateness. While such considerations may ultimately result in conditions and compensation similar to those currently proposed, they would be reached with greater transparency for the decision-maker.
6. My assessment of potential effects against the effects management hierarchy indicates that, while the existing environment does not allow for the avoidance of effects, some—such as those arising from reduced flows in the Tekapo River (Takapō River)—could be mitigated. Genesis has not considered the provision of environmental flows within the Takapō River, and the primary approach to managing effects is through actions that remedy impacts on avifauna, delivered as part of a compensatory package.
7. Broadly, all types of potential effects on avifauna are addressed to some degree by the consent conditions including the associated proffered Indigenous Biodiversity Enhancement Programme (IBEP). While the proposed IBEP actions (as detailed within the draft Kahu Ora strategic plan) do not address all habitat locations potentially affected, the remedial work is focussed on important habitats and those directly affected by the TPS.
8. Greater effort than is currently occurring will be required to reverse avifauna population declines. While previous compensatory work (i.e., Project River Recovery) has been effective in improving river bird populations upstream of the TPS influence, pressures such as weeds and pests are expected to increase, and some species, such as wrybill, have yet to respond to existing management. This indicates that additional management effort—such as that provided by the IBEP—is warranted.

¹ Application - Appendix Q Avifauna Takapō Power Scheme Reconsenting; Assessment of Ecological Effects – Avifauna. Prepared for Genesis Energy Limited by BlueGreen, dated 3 April 2025.

9. Given the difficulty in isolating the TPS as the primary driver of river bird declines, the most reliable way to demonstrate that the scheme is not contributing to ongoing declines is by showing measurable improvements in the catchment's river bird populations.
10. Regardless of whether the effects management approach involves mitigation or compensation, it should be held accountable for delivering its intended outcomes. While I consider the proposed conditions, including IBEP, capable of achieving positive results for avifauna, I recommend that the programme include outcomes for river bird populations. I also recommend include an additional consideration in the 5–10-year reviews of the strategic plan that there is an independent assessment of resource allocation principles including whether funding and resourcing are adequate to achieve its objectives and associated outcomes.

Agreement with the applicant

11. I agree with Genesis's expert Dr Bull that it is difficult to quantify the magnitude of potential effects of the TPS on avifauna due to the inter-related nature of ecosystem variables.
12. However, we both identify the general location and nature of potential effects of the continued operation of the TPS. These include indirect and direct impacts on feeding and breeding habitat in the Takapō River and on the Lake Tekapo (Takapō) edge.
13. Effects relate to changing water levels of lake and river delta habitats; and discharges and flow levels of the Takapō River downstream of Lake George Scott Weir. Flows (or a lack of flows) in the Takapō River have implications for avifauna food sources (aquatic invertebrates) and habitat quality (namely effects related to weed encroachment and mammalian depredation).
14. While I agree with Genesis's conclusions regarding the general location and nature of potential adverse effects on avifauna, the Applicant did not assess whether potential effects are likely to increase or decrease over the next 35 years. However, future projections indicate that existing pressures contributing to river bird declines—such as predation, invasive weeds, and adverse flow or lake level fluctuations—are likely to intensify, with the scheme's operation exacerbating these factors. Considering this worsening context and the ongoing decline of several avifauna populations within the catchment, additional management efforts beyond those currently in place are required to reverse these trends.
15. Further points of agreement with Dr Bull include:
 - a) We agree that additional measures to assist with the conservation efforts for wrybill in the Waitaki catchments should be investigated².
 - b) We agree that a program such as the IBEP can be used in respect of potential effects on avifauna, especially where those effects cannot be directly associated with a particular scheme operation.
 - c) And, given the mobile nature of avifauna, we agree that an integrated catchment approach is important, albeit still addressing relevant effects of the scheme.
 - d) With regards to management interventions, we agree that island creation should have positive benefits for birds in the catchment. I would further note that Island

² Page 41 of Appendix Q Avifauna Takapō Power Scheme Reconsenting; Assessment of Ecological Effects – Avifauna. Prepared for Genesis Energy Limited by BlueGreen, dated 3 April 2025.

creation/enhancement has become one of the more successful tools to improve the nesting success of riverbed nesting birds, particularly for black-fronted terns. With research and recent experiences indicating however that these interventions must be set within intensive wider landscape scale pest control programmes and consideration of aerial predation by Southern black-backed gull/Karoro.

Benefits of the project

16. The proffered compensation will have some benefit for freshwater avifauna which utilise habitats of the Waitaki catchment.
17. The draft Kahu Ora Strategic Action Plan includes specific actions targeting the habitats of freshwater avifauna associated with the Takapō River and Takapō.
18. The Strategic Plan promises a more integrated approach than its predecessor, Project River Recovery, and operates at a scale approximately three times greater. Assuming the contributions of other parties to this integrated approach are maintained, Kahu Ora's efforts have the potential to deliver additional benefits for avifauna beyond those currently being achieved.
19. I acknowledge that the question of flows in the Takapō River (which could be imposed to mitigate effects on avifauna) would likely have an impact on the regional and national benefits of the application.

Outstanding matters and significance of these.

Discussions with Applicant

20. On 27 June 2025 I had a Technical Discussion with applicant's expert Dr Bull regarding the actual and potential effects of the TPS on freshwater avifauna. This discussion clarified the nature of potential effects including spills arising from the scheme's operational activities and reiterated our areas of agreement – as noted above.
21. Residual matters of the discussion (including matters not discussed with Dr Bull) include whether the proposed effects management approach is appropriate or adequate with regards to effects on avifauna.

Outstanding matter - proposed effects management approach

22. The Kahu Ora programme does not seek to directly mitigate the potential effects of the TPS, rather it is proffered as compensation. The appropriateness of this approach depends on how the RMA (Resource Management Act 1991) effects management hierarchy is applied—specifically, whether effects are first avoided and mitigated before considering remediation, offsetting, or compensation. I believe this is ultimately a matter for the decision-maker and include below some consideration of how the proffered conditions address the identified effects of the TPS on avifauna.
23. Proposed Condition 25 requires the IBEP to focus work primarily, but not exclusively, on those waterbodies directly affected by the Waitaki or Tekapo power schemes³. This

³ Pg. 9, Appendix D Takapō Power Scheme Proposed Consent Conditions, dated 25 July 2025.

ensures the allocation of IBEP funding and actions do target important habitats directly affected by the TPS. Consequently, many of the compensatory actions remedy effects of the scheme.

24. Priority actions of Kahu Ora have been identified for the first 10 years of operation and I have used these to identify whether direct and indirect potential effects of the TPS are likely addressed by the proposed conditions (in terms of effect area or type - not level of effect) (**Table 1**). All broad areas of potential effects on the Tekapo catchment are addressed to some degree by the consent conditions and the associated IBEP.
25. Notably, 53% of the proposed IBEP Zone 2 investment (\$416,000) is targeted in the first ten years towards actions within the Takapō River. This is to action weed control, predator and browser control and habitat enhancement including 'non-vegetative island creation' (presumably an enhancement for freshwater avifauna breeding habitat).
26. No actions have been proposed to address the indirect potential effect of mammalian predation on freshwater avifauna at the Takapō Lake edges within the first ten-year plan of the IBEP. As noted by Dr Bull lowering of water levels can leave nests exposed to introduced mammalian predators⁴. Should a more reductionist effects management approach be sought, management of this effect would be required.
27. Re-establishment of environmental flows to the Takapō River to mitigate effects of the diverted flows has not been considered by the Applicant. Environmental flows are a potential mitigation measure; however, I understand that the generation opportunity cost and uncertainty over long-term ecological gains may make targeted habitat management within the catchment a comparatively preferable option.

28. Table 1 Potential effects of the TPS and proposed mitigations and compensatory actions

Potential effect <i>General location and overall nature of the effect on freshwater avifauna</i>	Proposed mitigations and compensatory actions
Takapō Lake edge – habitat/nest inundation	Kahu Ora - Zone 1 10yr actions: adjacent wetland focal point enhancements inc. Rapuwai lagoon, Mailbox inlet. Weed control Takapō bays.
Takapō River – habitat/nest inundation	Proposed conditions 10-13 require gradual release and close-off of water discharges to the Takapō River. Kahu Ora – Zone 2; Habitat Enhancement inc. island creation which may also mitigate inundation risk.

⁴ Pg. 9, section 5.1.1, s92 Response; Appendix Q Avifauna Takapō Power Scheme Reconsenting; Assessment of Ecological Effects – Avifauna. Prepared for Genesis Energy Limited by BlueGreen, dated 3 April 2025.

Takapō River – weed encroachment of feeding/breeding habitat	Kahu Ora - Zone 2; Joint fairway weed control with CRC; Fork Stream weed control; upper reach of the Takapō River inc. 8 assoc. wetlands in the Upper Takapō River.
Takapō River – mammalian predation of avifauna	Kahu Ora - Zone 2; Control of mammals, browsers (& Karoro); island creation.
Takapō Lake edge - mammalian predation of avifauna	No apparent provision within Kahu Ora 10yr actions. Zone 1 – Godley River weed control may mitigate.

Outstanding matter - the adequacy and effectiveness of the proffered conditions

29. With regards to the level of conservation effort offered by Kahu Ora, the declines of several populations of river bird species within the Waitaki catchment indicates that additional management effort to what is currently occurring is needed to reverse these trends. The decreasing population trend for shallow water waders (banded dotterel and wrybill) as inferred by Upper Waitaki river bird counts is particularly concerning.
30. Given the difficulty in isolating the TPS as the primary driver of river bird declines, the most reliable way to demonstrate that the scheme is not contributing to ongoing declines is by showing measurable improvements in the catchment's river bird populations.
31. The proposed IBEP does not explicitly include outcomes for increased river bird populations. River bird values are to be protected, and bird population trends will be monitored⁵ however the Kahu Ora plan does not require maintenance or improved population trends for avifauna.
32. Outcome monitoring and adaptive management are critical elements of large-scale conservation programmes such as the IBEP. The Kahu Ora plan recognises this, incorporating monitoring and an adaptive management approach. However, it is unclear what should happen if outcomes are not achieved due to an inadequacy of resources and funding.
33. The Kahu Ora plan recommends three considerations are taken into account during a proposed 5-yearly review⁶. These include allocation of resources based on several principles, balance of risk across the catchment, and past investment⁷. Neither the proposed conditions nor the Kahu Ora plan require consideration of the adequacy of resourcing and funding to deliver its objectives as associated outcomes.

⁵ Page 30, 35 & 36 of the draft Kahu Ora plan list the outcomes sought by the program for Takapō river and lake environments (Zone 1 & 2) within the first 10 years.

⁶ Page 50 (Section 4.5) of the draft Kahu Ora plan states a 5 yearly re-evaluation of action priorities and their delivery timing will be required.

⁷ Page 49-50 of the draft Kahu Ora plan outline the recommended approach for a 5 yearly re-evaluation of action priorities.

34. Compared to Project River Recovery the Kahu Ora programme is a significant step up in terms of funding amount and scope (both in terms of sought outcomes and geographic scope). I would expect staff resourcing or project management costs to necessarily increase. Provisions for additional staff and or project management resourcing is not evident within the provisions of the draft Kahu Ora plan⁸.
35. Regardless of whether the effects management approach involves mitigation or compensation, it should be held accountable for delivering its intended outcomes. While I consider the proposed conditions, including the IBEP, capable of achieving positive results for avifauna, I recommend (while acknowledging that it is proffered compensation) that the IBEP include outcomes for river bird populations (and by the same rational other indigenous taxa). I also recommend include an additional consideration in the 5–10-year reviews relating to resource allocation principles, including whether funding and resourcing are adequate to achieve its objective and associated outcomes (**Table 2**).

Significance of these matters

36. The effects management approach has significant implications for the management of effects on avifauna. Considering effects sequentially in accordance with the effects management hierarchy ensures effects management is the most appropriate. In this case allowing for a consideration of whether mitigation of effects results in a better outcome for avifauna than remediation, offsetting or compensation.
37. While I acknowledge that the values of the Takapō River have been modified by the TPS and that the existing environment includes this modification, I consider that the scheme is still having an ongoing effect in terms of a lack of habitat/food for birds in the river. Introducing an environmental flow could mitigate this impact on avifauna by increasing the extent and quality of feeding and breeding habitat. The benefits of such mitigation should be weighed against those of remediation options, with the decision-maker then able to consider each in the context of their wider social, cultural, political, and economic implications.
38. While such considerations may ultimately result in conditions and compensation similar to those currently proposed, they would be reached with greater transparency.
39. Ensuring that effects management measures, including compensatory provisions, are effective is fundamental to successful effects management. Well defined outcomes and provisions to enable adaptive management, including review of resourcing, are likely to be critical to achieving the IBEP objectives.

Solutions and/or Conditions sought

⁸ This lack of detail may be due to the proposed Kahu Ora programme being described within a draft strategy document and the programme is yet to develop “outcome plans” which might provide the outcome monitoring detail not currently provided by the strategy document (see Pg. 9 of the Kahu Ora strategic action plan document). Within the Department of Conservation, work under the strategic action plan will be kept separate as a series of nested “outcome plans” under several of its outcomes-focused programmes within BioInvest – a project management platform of the Department of Conservation.

40. **Table 2** provides a summary of solutions or conditions sought to address those matters of significance discussed above.

Table 2: Solutions			
Issue	Solution	Condition wording* *Condition numbering is from Schedule One Conditions (Draft Conditions, dated 25 July 2025; From Page 12 onwards).	Consideration against FTAA
Lack of explicit and clear outcomes for river bird populations to be maintained or increased.	Acknowledging that the IBEP is proffered, it should include clear measurable outcomes for river bird populations / river bird population trends over time with defined thresholds and decision triggers.	Suggested edits (bold) to proposed Condition 25: Additional clause – <i>25. In accordance with the objective of the IBEP as set out in condition 23 the IBEP will:</i> ... d) include outcomes to maintain or increase indigenous plant, fish, invertebrate, lizard and avifauna populations within catchments affected by the Waitaki or Tekapo power schemes. This should precipitate clear and measurable outcomes for targeted taxa within the Strategic Plan such as: “From Year 1 of monitoring, the annual index of breeding wrybill (<i>Anarhynchus frontalis</i>) pairs on the Godley River, measured by the approved method, shall show no statistically significant negative trend ($p < 0.05$) over any consecutive 10-year monitoring period. A negative trend triggers Condition X, Clause X adaptive management requirements.” I note that this inclusion in the IBEP would still enable the Strategic Plan to determine which particular taxa are targeted. This provides an unambiguous outcome that is enforceable and links to a compliance action.	This proposal for the IBEP to include explicit outcomes for taxa populations would not be more onerous than existing provisions within the draft Strategic Plan. Outcome monitoring actions already listed include invertebrate, lizard and avifauna population trend monitoring. This additional condition ensures outcomes address the primary ecological concern – population declines.

Recommended considerations included in the proposed 5–10-year reviews of the IBEP do not include funding and resourcing adequacy.	Provision for independent review and if necessary, adjustment of funding and resourcing for achieving IBEP objectives and associated outcomes.	Suggested edits/additions (bold): Condition30 (f) Review will consider resource allocation principles, the balance of risk across the catchment, past investment and the adequacy of funding and resourcing to the IBEP objectives and associated outcomes. These considerations (excluding the last) are those recommended by the current draft Kahu Ora strategic action plan (Page 50). Additional wording on ‘outcomes’ to be added to Condition 30 regarding the review of the Strategic Plan: Conditions 28. d) Identify the key implementation milestones and outcomes to be achieved over the Strategic Plan Period in accordance with the priorities; and... e) Identify the monitoring that will be used to demonstrate the achievement of the milestones and outcomes that are set out in the Strategic Plan over the Strategic Plan Period; and.. Condition 30. b) Identify whether the key milestones and outcomes set out in the Strategic Plan were achieved; and ... c) Identify whether the monitoring undertaken was appropriate for demonstrating whether the milestones and outcomes in the Strategic Plan were achieved; and	This provision ensures independent and comprehensive review to determine the efficacy of the IBEP provisions.
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		d) Identify if any milestones or outcomes were not achieved, and if so, the causes of non-achievement and any matters that should be revised in the next Strategic Plan. Edit condition 34 to refer to objectives and associated outcomes (condition 25d.): 34. d. Identify progress towards achievement of the Strategic Plan objectives and associated outcomes (condition 25d.).	
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