

**IN THE ENVIRONMENT COURT
I MUA I TE KOOTI TAIAO O AOTEAROA**

UNDER the Resource Management Act
1991

IN THE MATTER of appeals under clause 14 of the
First Schedule of the Act

BETWEEN **ARATIATIA LIVESTOCK
LIMITED**
(ENV-2018-CHC-29)

MERIDIAN ENERGY LIMITED
(ENV-2018-CHC-38)

**FEDERATED FARMERS OF
NEW ZEALAND**
(ENV-2018-CHC-40)

(Continued next page)

**STATEMENT OF EVIDENCE OF
JAN MARIE RIDDELL FOR THE WAIAU RIVERCARE
GROUP INCORPORATED
19 August 2022**

Judicial Officer: Judge Borthwick

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**TE RUNANGA O NGAI TAHU,
HOKONUI RUNAKA, WAIHOPAI
RUNAKA, TE RUNANGA O
AWARUA & TE RUNANGA O
ORAKA APARIMA
(ENV-2018-CHC-47)**

**ROYAL FOREST AND BIRD
PROTECTION SOCIETY OF NZ
(ENV-2018-CHC-50)**

Appellants

AND

**SOUTHLAND
COUNCIL**

REGIONAL

Respondent

Introduction

Introduction

1. My name is Jan Marie Riddell, QSM. I hold the qualifications of B.Sc (Hons) from the University of Otago, majoring in earth sciences and in particular hydrology.

Qualifications and Experience:

2. I have 45 years of experience working in the field of natural resource management.
3. I chaired the Waiau Working Party from 1989 to 2021 (32 years) and worked part time for the Waiau Fisheries and Wildlife Habitat Enhancement Trust (Waiau Trust) from 1997 to 2020 (23 years) as a Strategic Planner, designing wetland projects, preparing project Resource Consents and Compliance Reports and numerous other tasks.
4. I was a member of the Southland Conservation Board for 11 years, and chaired the Board for the majority of that time.
5. I served on the NZ Conservation Authority from 2014 to 2020.
6. I have been a member of the Nature Heritage Fund since 2002 and currently chair this Ministerial Advisory Committee (2017 to 2022).
7. I was an elected member of the Southland Regional Council (Environment Southland) from 1989 – 1995 and again from 2010-2016.
8. My husband and I are sheep farmers in the Hokonui/Browns district in Southland.

The Manapouri Power Scheme, the establishment of the Waiau Working Party and the 1996 Resource Consent process

9. The Waiau Working Party (WWP) was established by the Southland Regional Council and ECNZ (then the owner/operator of the Scheme) in 1989/90. It is a

community consultative group and was tasked with working through all the significant adverse effects on the Lower Waiau River, associated with the diversion of 450m³/s of water from the Lower Waiau River through the Manapouri Power Station, which began in 1969. This consultative process led up to the application for Resource Consent for the Manapouri Power Scheme (MPS) under the RMA 1991.

10. The establishment of the WWP, provided a vehicle to address the long held and simmering discontent in the community about the state of the Lower Waiau River catchment, since the MPS became operative in 1969. From the outset members of the WWP approached the consultation process with feeling and compassion. This attitude is still prevalent today.
11. In the late 1960's and early 1970's NZ had focused on saving Lake Manapouri from being raised, which would have resulted in arguably New Zealand's worst ecological disaster. The effects of the diversion (abstraction) of water for power generation on the Lower Waiau River were largely neglected by all but a small number of concerned local people.
12. Between 1990 and 1996 the significant adverse effects of the Manapouri Power scheme on the Lower Waiau River were studied in detail by the WWP and ECNZ. Studies included:
 - a. Before and after scheme river flow regimes;
 - b. Native fisheries (including eels);
 - c. The trout fishery;
 - d. River dependent birds;
 - e. Macroinvertebrates;
 - f. River geomorphology;
 - g. Sediment transport and erosion;
 - h. Waiau Lagoon;
 - i. River mouth and lagoon barrier configuration;
 - j. Wetland loss;
 - k. Groundwater resources;
 - l. Recreational resources;
 - m. Access to the river;
 - n. Landscape values of the river valley;
 - o. Social effects within the community; and
 - p. Mana Whenua issues.

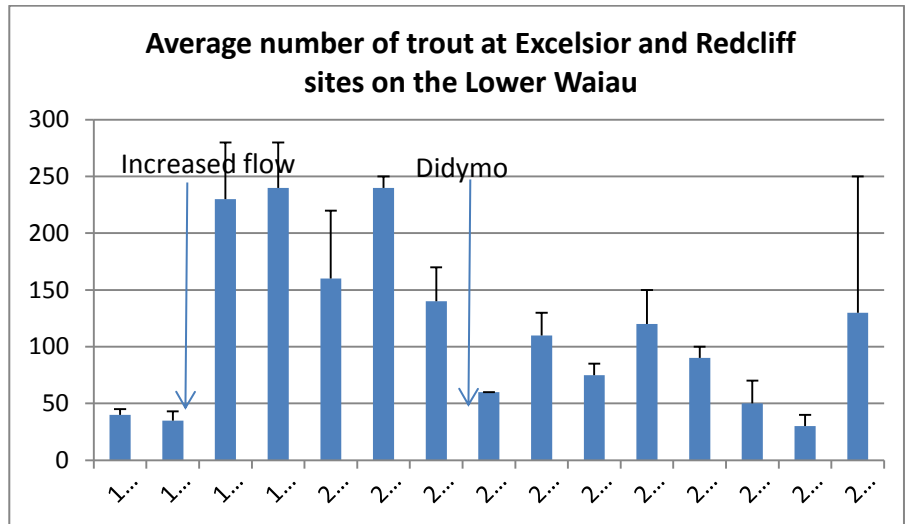
13. The ecological health of the Lower Waiau ecosystem was a key focus for the WWP from the outset.
14. The 1990 - 1996 process was successful. The most significant outcome was a new minimum flow regime established at the Manapouri Lake Control structure (MLC, also known as the Mararoa Weir), where there had previously been no specified minimum flow. At times the MLC discharge to the Lower Waiau River was a mere 1m³/s. The MLC downstream to Redcliff stream was the most severely impacted reach of the Lower Waiau River. The minimum flow regime (12, 14, 16 m³/s, depending on the time of year) was considerably less than the 30m³/s optimum minimum flow recommended using the IFIM method for defining adult brown trout, food producing and *Deleatidium* habitat (Jowett 1993). At the time many people considered this outcome to be a compromise, but a start, in terms of improving the ecological state of the Lower Waiau River.
15. Other water related outcomes addressed in the 1996 Resource Consents included recreational flows, a flushing flow to keep the river mouth open, construction of a fish pass at the MLC, elver (juvenile eel) transfer upstream across the MLC and transfers downstream to the Lower Waiau River of mature migratory eels from Lake Manapouri.
16. The process followed began before the RMA was enacted in October 1991. To all intents and purposes a “discretionary activity” type status was pursued from the outset. This meant the full range of issues and adverse effects was considered.
17. At the time of settlement in 1996, the WWP considered it had addressed issues and adverse effects to the best of its ability, but recognised the settlement as a start, given the significant adverse effects that had been ongoing since 1969 and would continue into the future.
18. The 1996 Resource Consents have extensive monitoring conditions. It needs to be noted that the WWP has an ongoing review (7 yearly) and reporting role under these Consents. The role defined in the 1996 Resource Consents reflected the knowledge the WWP had acquired during the extensive consultation

period and recognised the need for the owners of the MPS to continue to involve the local community in the review of monitoring conditions attached to the Resource Consents, designed to address the state of the Lower Waiau River.

Changes to the Lower Waiau River Flows and Ecology, 1996 – 2002/03, the 2nd Tailrace Tunnel and the arrival of the exotic invasive algae *Didymosphenia geminata* in 2002/03

19. In the late 1990's MEL (Meridian Energy Limited) announced the intention to construct a second tailrace tunnel, using a 10m diameter tunnel boring machine. This was designed to improve the efficiency of the power station. The Waiau Working Party was assured that no additional water would be diverted from the Lower Waiau River and the maximum discharge to Deep Cove /Doubtful Sound would remain at 510m³/s. This second tailrace tunnel became operative in 2002/03.
20. Subsequent enquires revealed that once the second tailrace tunnel became operational, on average an additional 3-4 m³/s was being diverted from the Lower Waiau River through the Power Station. The WWP was told this by the late Colin Sinclair (a MEL employee) and it has never been denied by MEL.
21. This additional water use was enabled under the existing 1996 Resource Consent maximum discharge of 510m³/s to Deep Cove and meant the adverse effects of the loss of the additional water diverted from the Lower Waiau River were never assessed.
22. The exotic invasive algae *Didymosphenia geminata* (Didymo) arrived in the Waiau River catchment in 2002/03. The Mararoa River, Upper Waiau River and Lower Waiau River were infested and remain severely impacted by this species today. Considerable research went into methods of controlling didymo, but none proved practical, at scale. The most practical management method in the Lower Waiau River has proven to be the provision of adequate volumes of flushing flows to slough off the excessive biomass.

23. The graph below (M Rodway, pers. comm.) shows the results of annual drift diving brown and rainbow trout counts below the MLC from 1996 – 2013. It clearly demonstrates the positive ecological response of brown and rainbow trout numbers post the minimum flow introduction in 1996 and the impact of the invasive Didymo on brown and rainbow trout numbers after 2002/03.



24. The invasion of Didymo was viewed by the WWP as a major step backwards and undermined the ecological gains made by the minimum flow regime at the MLC, particularly in the reach below the MLC, noting that the whole 80km of the Lower Waiau River (from the MLC to the Waiau Mouth) has been significantly impacted.

Manapouri Te Anau Amended Discharge (MTAD) Resource Consent 2009

25. In 2009 MEL applied to Environment Southland for a Resource Consent to increase the tailrace discharge to Deep Cove from 510m³/s to 550m³/s. The project was known as the Manapouri Te Anau Amended Discharge (MTAD) project.
26. The WWP was unanimously opposed to the planned application and concerned about the additional adverse effects on the Lower Waiau River, because of the loss of further water from the Lower Waiau River. The WWP pleaded with MEL to adopt a community consultative approach to this proposal, which had proved successful in 1996. MEL chose the adversarial route, going straight to an Environment Southland Hearing in

September 2009. The WWP had few resources to contribute to the Hearing other than their own expertise. Sadly this did irreparable damage to the relationship between the WWP and MEL.

27. The MEL case put to the Hearing Committee focussed on the effects on flows in the Lower Waiau River of the diversion of additional water. The hydrology report (Mabin 2009) used a predictive model – SODAPOP - to define the effects on the Lower Waiau River flows. A key point from this modelling exercise showed that MTAD would result in using an average of 10m³/s of additional water that would otherwise have gone down the Lower River. It also stated that there would be an additional 18% loss of flow down the Lower Waiau River.
28. The modelling exercise used the hydrological record for the Lower Waiau River and looked at the effects of MTAD on various sized floods in terms of the reduction of peak flows, their duration and flow volume. This information on the effects on each and every flood is critical in terms of understanding the effects of MTAD on the Lower River hydrology and for a healthy river ecosystem.
29. The decision to grant consent was based on the SODAPOP model findings. This model has been surpassed by a better model and is no longer used. There is no publicly available information on the differences between the two models in terms of predicting MTAD water use and the effects on the Lower Waiau River floods.
30. The MTAD Resource Consent Conditions also include an ongoing review role for the Waiau Working Party. Since the granting of the MTAD Resource Consents in 2010 the WWP and MEL have rationalised the monitoring Conditions of the 1996 and MTAD Consents.
31. Under the existing consents MEL is not required to publicly report the volumes of additional water diverted from the Lower Waiau River (as a result of the 2nd Tail race tunnel and MTAD), hence the adverse effects of additional water loss on the Lower Waiau River ecosystem cannot be adequately assessed.

32. The MTAD Consent conditions required the development of a voluntary Flushing Flow Management Plan in conjunction with the WWP. This was designed to manage the nuisance periphyton problem in the lower Waiau River during the late spring – summer - early autumn time period. Excess periphyton was identified as an increasing problem in the Lower Waiau River in the late 1990's. The whole issue of excessive periphyton was exacerbated with the arrival and spread of the exotic invasive algae *Didymosphenia geminata* in 2002/03. The Flushing Flow Management Plan includes the provision of up to **5 flushing flows** to be released at the MLC. These flows are designed to slough off the nuisance periphyton from the bed of the river, from the MLC to the Lagoon. These flows must be of a certain volume and duration to be effective. Further detail on the voluntary Flushing Flow Management Plan is provided in paragraphs 51 – 58.
33. The WWP and MEL spent the time between May 2010 and October 2012 (when the MTAD Resource Consent was first exercised) working on the voluntary Flushing Flow Management Plan. Since that time to the present day (10 years) the key focus of the WWP has been the effectiveness of the flushing flow regime on improving the Lower Waiau River ecosystem health.

Waiau catchment hydrology

34. The table below highlights the changes to Lower Waiau River flows, as a result of the various facets of changes to the operation of the MPS from 1969 onwards.
35. It must be noted there has not been a whole catchment hydrology report completed for the Waiau Catchment since 1993 (Riddell and Freestone). The flows documented below represent the best available data, gathered from a variety of sources. The fact that the changes to the hydrology of NZ's most dewatered river are not adequately documented is unhelpful in terms of understanding, more fully, the effects on the Lower Waiau River ecology.

Lower Waiau River Flow Regime and Timeline

Location	Pre-scheme flows (up to 1969):	Post-scheme flows (1969 – 1996):
Lower Waiau River (d/s Mararoa River confluence)	mean annual flow (MAF) ~ 360m³/s	MAF ~ 60m³/s Minimum flow (when gates shut) – 0-1 m³/s.
Lower Waiau River (Tuatapere)	MAF ~ 550m³/s Mean annual low flow (MALF) – 220m³/s	MAF ~ 122m³/s (longer time period) MALF ~ 34.9 m³/s (longer time period)
Tailrace discharge to Doubtful Sound	0 m³/s	MAF ~ 450m³/s (longer time period) maximum - 510 m³/s

Post 1996 Consent (1996 – 2022): Additional changes (+ and -) to Lower Waiau River Flows

36. **1996:** Lower Waiau River (d/s Mararoa River confluence) – Minimum flow of **12 – 16 m³/s** established. This was a **positive** outcome for the Lower Waiau River.
37. **2002/2003:** Second tailrace tunnel built and commissioned within the existing 1996 consents – **3 – 4 m³/s** of additional river water was able to be used for power generation. A **negative** outcome for the Lower Waiau River.
38. **2010:** MTAD Resource Consents granted increasing the tailrace discharge from a maximum of **510 to 550 m³/s**. MEL evidence provided for the Consent Hearing, states MTAD would use **on average** an additional **10 m³/s** (18%) of Lower Waiau River water, based on predictions of the SODAPOP model employed at that time. This additional water going through the power station comes from flood flows that would otherwise have gone down the Lower Waiau River. Flood peaks of small to large sized floods are truncated (peaks lessened) and the duration of such flood events can be shorter. The Resource Consent conditions **do not**

require any reporting of the volume of Lower Waiau water used by MTAD. Also there is no requirement to identify which floods have been affected by MTAD. A **negative** outcome for the Lower Waiau River.

39. **2010/2012:** The MTAD Consent conditions required the development of a Flushing Flow Management Plan in conjunction with the WWP. This was designed to manage the nuisance periphyton problem in the lower Waiau River during the later spring – summer – early autumn time period. It involves the provision of **five flushing flows** released at the MLC. These flows are designed to slough off the nuisance periphyton from the bed of the river, from the MLC to the Lagoon. These flows must be of a certain volume and duration to be effective. A **positive** outcome for the Lower Waiau River in the warmer months, **if delivered. If not delivered** as per the flushing flow Management Plan, then there is a **negative** outcome for the Lower Waiau River. The Flushing flow situation is elaborated on in paragraphs 51 – 58.
40. Taking into account all the above information it is worth reiterating the need for all the above flow changes to the Lower Waiau River hydrology to be summarised and flow statistics calculated to provide a sound basis for accessing the ecological effects of these flow changes on the Lower Waiau River.

The ongoing significant adverse effects of the Manapouri Power Scheme on the Lower Waiau River – the need for maximum flexibility

41. The adverse effects of the Manapouri Power scheme on the Lower Waiau River ecosystem have been significant and are ongoing. The 1996 Resource Consent granting was based on the research and knowledge at that time. Mitigation and remediation of these significant adverse effects need to be continually monitored and reviewed.
42. Under the original Southland Water Plan (2010) the MTAD resource consent application was for a non-complying activity. This reflected the fact that the waters of the Lower Waiau are fully allocated from an ecological perspective.

43. MEL is in an extremely privileged position with respect to the use of the waters of the Waiau catchment. The diversion of the Lower Waiau River waters (450m³/s) through the MPS in Fiordland National Park is by far the largest diversion and abstractive take from any river in New Zealand. The current consents are due for renewal in 2031 and will be considered under the final version of the Water and Land Plan (2016). If granted for a further 35 years under the RMA, through to 2066, this will mean that in 2066 the Lower Waiau River will have had a severely disrupted ecosystem for close to 100 years. It is illogical for planning processes, defined today, to hinder the need to continually monitor and quantify and continue to address the significant adverse effects of the MPS on the Lower Waiau River into the future.
44. The point needs to be made that monitoring programmes attached to the Water Permits (1996 and 2010) attempt to address the effects of the Power Scheme on the Lower River. They are not designed to consider the wider catchment in an integrated way. In this respect it is necessary to reiterate the point that the Waiau catchment has not had a comprehensive hydrology report completed and published for the whole catchment since 1993.
45. It is essential that the proposed Objectives, Policies and Rules of the Southland Water and Land Plan (pSWLP), pertaining to the Waiau River, provide maximum flexibility in terms of assessing the ongoing significant adverse effects of the continuing operation of the MPS.
46. The NPSFW and the proposed FMU framework to assess water quantity and quality limits, and catchment ecological state, require the operation of the MPS and the significant adverse effects of the diversion on Lower Waiau River ecology to be fully considered in terms of the whole catchment.

Assessing the Ongoing Significant Adverse effects – new technologies

47. Advances in ecological science should be a key driver to assessing the adverse effects of the Power Scheme on the Lower Waiau River and wider catchment. Limiting of aspects of the MPS effects that can be

considered, under any Rule and activity status, will be detrimental for the ecological future of the river.

48. An example is the new Net Rate of Energy Intake (NREI) predictive models used to assess aquatic species' minimum flows requirements, reflecting ecosystem ecological needs, compared with the traditional hydraulic habitat modelling (Jowett 1993). Research (Kees 2020) shows the traditional minimum flow predictive hydraulic models may underestimate the benefits of flows (from MALF to at least $\frac{1}{2}$ of the median flow) for drift feeding brown trout, for example. These new techniques should be employed to establish flow regime requirements for multiple species along the whole length of the Lower Waiau River and the wider catchment.
49. Another example is the new genome technologies which enable the identification of freshwater species present at a given water sampling location along the length of a river. This technology is a major step forward in ecological surveys of freshwater ecosystems.
50. The inevitable advances in science in the future will provide the ability to better understand and assess the adverse effects of the MPS on the Lower Waiau River ecosystem and wider catchment. Planning provisions should not restrict, in any way, the ability to better understand the ecological status of the Waiau catchment waters and the permanent and ongoing effects of the loss of water to the Lower Waiau River.

Unresolved significant adverse effects issues – the Flushing Flow Regime

51. To understand the current situation further detail about the MTAD Resource Consent process is required.
52. Leading up to 2009 and the MTAD Resource Consent application in 2009, it is important to note the WWP was already concerned about excessive periphyton growth (including the invasive exotic alga didymo) in the Lower Waiau River during the warmer months. The effects of the excessive periphyton growth was considered to be detrimental to recreation and the wider ecosystem health. Flushing flows were trialled from 2006 onwards. One of the conditions of the MTAD consent was for the

WWP and MEL to develop Flushing Flow Management Plan to address the significant periphyton issue in the Lower Waiau River.

53. From the time of the granting of the MTAD consent (May 2010) until mid-2012 a Voluntary Flushing Flow Management Plan (VFFMP) was devised and agreed upon, and submitted to Environment Southland. It includes the provision of five flushing flows from the MLC between November and May. These flows are designed to slough off excessive periphyton growth. To provide sufficient volume and velocity they need to average 120m³/s at the MLC and be of 24 hours duration, normally with a peak flow in excess of 120m³/s.
54. 15GWH of water was to be available to fulfil the flushing flow programme. This was agreed to and signed off by MEL and the WWP. It was called a Voluntary Flushing Flow Plan and is based on regular monitoring of periphyton biomass (the Standing Crop Index – SCI) at defined sites along the Mararoa and Lower Waiau Rivers. A traffic light system – green/orange/red – was established with green levels of SCI requiring no action, the orange level requiring MEL to prepare to provide a flushing flow, and the red level requiring a flushing flow to be delivered. The voluntary part of the Plan relates to the fact that if lake levels are low, predicted lake inflows are small and various factors relating to the security of supply to the national grid are of concern, then the flushing flows **do not need to be delivered**. An adaptive management approach has been adopted to the Plan and minor changes have been made over time based on the analysis of the data from all flushing flows.
55. One of the key issues relating to the delivery of the flushing flows down the Lower Waiau River is that Lake Manapouri water levels need to be $\frac{3}{4}$ of the way up the main range of the lake water level regime. In dry years of low rainfall and low lake inflows this is problematic. Dry conditions typically occur during late spring, summer and autumn, and this is exactly the time when the Lower River needs the water for ecosystem health.
56. The non-delivery of flushing flows to manage the significant adverse effects of periphyton biomass on the

river ecosystem and aesthetic and recreational values of the river is an ongoing unresolved issue.

57. The success or otherwise of this flushing flow system has been extensively studied by Cathy Kilroy (2021 & 2021) of NIWA. Between November 2006 and March 2010, nine flushing flows were delivered. Post the granting of the MTAD consents (May 2010 – May 2021), 15 flushing flows have been delivered.
58. Kilroy has looked at every flushing flow delivered in terms of what has worked and successfully decreased the periphyton biomass. A number of variables are involved and patterns are emerging, but more analysis is required. A key factor, unsurprisingly, is that the larger the flushing flow peak and the longer the duration of the flushing flow, the more effective the flushing flow is at removing the nuisance periphyton (Kilroy 2021).
59. The flushing flow regime is an example of an unresolved issue. It will require ongoing research, monitoring and actions to resolve the issue and improve the ecology of the Lower Waiau River. Maximum flexibility around the activity status to address ongoing adverse effects, and any future emerging adverse effects, is required.
60. Further, it is not possible to be certain about future effects on the environment, and particularly the statistics relating to the flow regime the Lower Waiau River with climate change.

Future Management of the river under the NPSFW/FMU System with a new Resource Consent due in 2031

61. The Waiau catchment needs to be considered as a whole, including the Lower Waiau River ecosystem health and the MPS.
62. Enabling the status quo to endure for decades to come sells the ecological health of the Lower Waiau River short. A long-term vision for the river ecology is required based on a thorough analysis of all past flow changes to the river and new and evolving scientific techniques. A multi-disciplined approach to restoring the river ecology to an acceptable level is needed.

63. Advances in ecological science – genome sequencing techniques enable the genetic identification of freshwater species present at any point in the river. Modelling of each species habitat and flow requirements will become possible with greater certainty, as will the definition of species to benefit from adjusted flow regimes. Opportunities for improvement in the river ecology need to be continually looked at and investigated.
64. Achieving a flow regime to improve Lower Waiau River and wider catchment ecology should be of equal importance to the income generated from the MPS.
65. Maximum planning flexibility is required and can only be achieved if future Resource Consent processes associated with the MPS are discretionary.

Waiau Fisheries and Wildlife Habitat Enhancement Trust (Waiau Trust)

66. The establishment of the Waiau Trust was one of the negotiated outcomes of the 1990 – 1996 consultation process for the renewal of the MPS resource Consents. The objects of the Trust Deed require it to carry out mitigation and remediation of adverse effects of the Manapouri Power Station in the Waiau Catchment. The settlement was \$5,000,000.00. No further funds have been made available from MEL to the Waiau Trust since 1996.
67. The current state of the Waiau Trust fund is: \$8,474,975.00 for the year ending 31 March 2022.
68. Since inception in 1996:
 - a. Total Trust Expenditure - \$7,961,002.00.
 - b. Total Trust Revenue - \$11,653,546.00.
69. From the outset the Waiau Trust took a holistic, ecosystem or integrated catchment approach to the task ahead of it. Four major wetland restoration projects have been completed along the mainstream of the Lower Waiau River. Permanently restoring and reconnecting these riparian wetland habitats with the Lower Waiau River are a key feature of these projects, ensuring fish passage to wetland habitats. These four

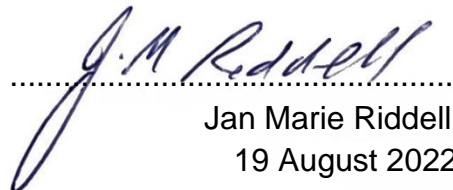
wetland projects have become major refugia for fish and wildlife.

70. Within the wider catchment the Trust has taken a sub-catchment, headwaters to confluence, approach to the restoration and protection of wetlands, streams and their riparian margins. Protection of whole sub-catchments has been achieved.
71. A total of 262 projects have been completed protecting and enhancing 3858 ha of these habitat types. Most of these projects are on private land. Fencing grants, removal of grazing stock and Covenants or Habitat Protection Agreements are the key mechanisms employed to secure the permanence of the habitats enhanced. Achieving these 262 projects has involved extensive collaboration with a large number of landowners.
72. The mitigation and remediation work of the Waiau Trust is very important in terms of the ecology of the streams and wetlands of the whole Waiau catchment. This habitat restoration work does not however replace habitat lost in the Lower Waiau River as a result of the loss of water down the lower river.
73. **Appendix 1** shows a series of aerial photographs of 3 major projects – the Whitebait Habitat Project, Papatotara Wetlands and the Rakatu Wetlands – adjacent to the Lower Waiau River. The restoration and enhancement of these wetland habitats makes a significant contribution to the Lower Waiau River ecosystem. All are hydrologically, and hence ecologically, linked to the Lower Waiau River.
74. **Appendix 2** provides a snap shot of the Waiau Trust's work in the wider Waiau Catchment, including the protection of wetlands and small streams in the sub-catchments. Achievements of habitat enhancement can be seen in these paired photos over time. Restoration of hydrological and ecological linkages are a key focus of all these projects, as well as improving water quality and biodiversity.
75. If the emerging ecological science technologies and a fully flexible planning approach and discretionary activity status is adopted, then the efforts of the WT

within the wider catchment will be able to be quantified and the contribution to mitigation and remediation measured more precisely.

Conclusion

76. To achieve better environmental outcomes for the Lower Waiau River ecosystem and the wider catchment ecosystem, and to better focus the mitigation and remediation of the significant adverse effects of the MPS within the Waiau catchment, then the status of the MPS water permits must be a discretionary activity. This will enable consideration of the full ambit of effects associated with the scheme, and appropriate conditions to be developed to address them.
77. Constraining the one-in-a-generation consideration of the scheme within a controlled activity framework, based on the current operation of the MPS, would be a disservice to the Lower Waiau River. The most up to date ecosystem science and future advancements in science need to be fully utilised, so monitoring mitigation and remediation efforts (including changes to the flow regime) can be best targeted. Such an approach will provide for both electricity production and the Waiau catchment ecological health in a more balanced way. The Lower Waiau River is owed this much as are the people of the WWP and other interested parties who have dedicated so much time and effort over the last 30 plus years.


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Jan Marie Riddell
19 August 2022

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Appendix One:

Examples of Waiau Trust Habitat Enhancement Trust projects, adjacent to the Lower Waiau River.

NB: Photos courtesy of Mark Sutton, Erin Garrett and Bruce Fraser.

Whitebait Project Waiau mouth, looking west. These wetlands (30+ ha) are hydrologically connected to the Lower Waiau River and the Waiau Lagoon. They provide valuable rearing habitat for Inanga (whitebait), returning from the sea in the spring. Short and long-fin eel and a wide diversity of bird life (34 species recorded to date), including international migratory birds, are also a feature of these enhanced and restored habitats.



Papatotara Wetlands, looking south towards the Waiau River mouth and across the river from the Whitebait project. The pre and post build photos show the two spring-fed streams dammed in 2019 to create 4ha of open water habitat. These wetlands are now home to inanga, short and long-fin eel and a wide variety of water dependent bird species (25 species recorded to date). The upper reaches include a small stand of Kahikatea forest, now protected as part of the project.



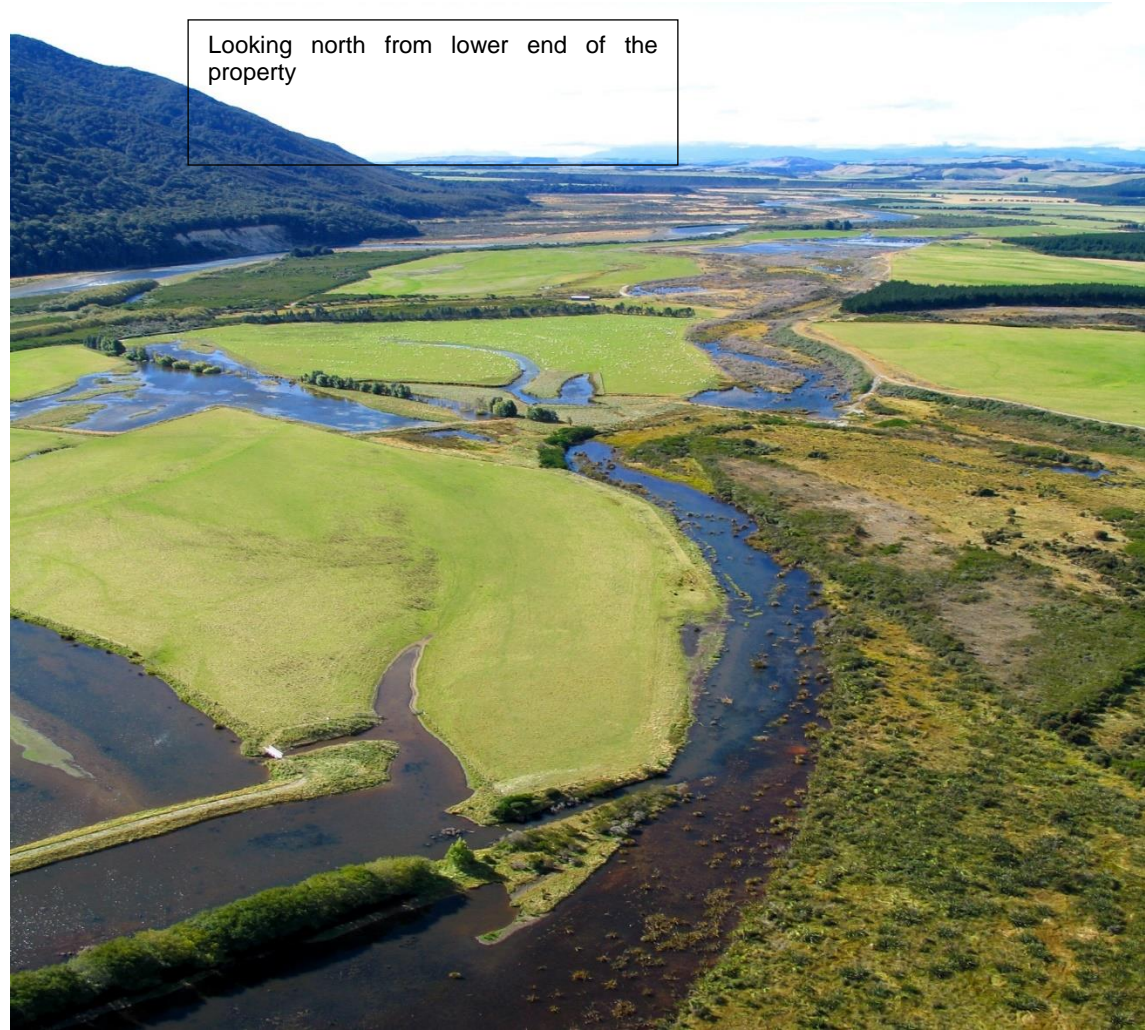
Rakatu Wetlands, Lower Waiau River (3 photos): The property was purchased in 2000. 50ha of open water wetlands were completed over the next 5 years. They are hydrologically and ecologically linked to existing remnant wetlands, the Redcliff wetlands and to the Lower Waiau River. The wetland habitat has become a stronghold for long-fin eel and is home to 45 species of water fowl, water associated species and a variety of native bush birds and passerine species.

Looking north to the Takitimu Mountains. The Lower Waiau River is at the left.



Looking west to Fiordland National Park.





Looking north from lower end of the property

Appendix Two: Examples of wider catchment wetland and small stream projects in sub-catchments (245 completed).



Dale Farm, **Fredburn Wetlands** Covenant (42.8 ha). Above – prior to construction and fencing – 2019. Below – post construction 2021. Blocking farm drains and reinstating original water levels and hydrological connections can produce immediate results and valuable habitat for fish and wildlife.





Duncaigen Farm, Lower Waiau, **Roses Wetland**: Above - fenced and Covenanted in 2013. Below – seven years later in 2021, showing rapid and remarkable improvement of the riparian vegetation and ecosystem health of this 7ha wetland.





EweBurn Farm, **Round Barn Covenant** 2011 and 2019: Again rapid recovery of vegetation in a relatively short time frame occurred, enhancing biodiversity and water quality of this 7.4ha wetland and outlet stream.





Unnamed **tributary of the Dean Burn**, Lower Waiau: This small stream was fenced and stock access ceased in 2013 (above). The riparian margins were planted in natives and by 2019 (below) were well established creating a stable stream environment benefiting the stream ecosystem and water quality.

