**BEFORE THE OTAGO REGIONAL COUNCIL**

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| **IN THE MATTER** | of the Resource Management Act 1991 |
| **AND** | |
| **IN THE MATTER** | Resource Consent Applications<br><br>RM16.093 by<br>Criffel Water Limited<br><br>and<br><br>RM18.345 by<br>Luggate Irrigation Company Limited and Lake McKay Station Limited |

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# STATEMENT OF EVIDENCE OF DR ROSEMARY CLUCAS FOR TE RŪNANGA O ŌTĀKOU, KĀTI HUIRAPA KI PUKETERAKI AND TE RŪNANGA O MOERAKI

**Dated 15 OCTOBER 2019**

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Barrister: Stephen Christensen

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## Introduction

1. Ko Aoraki te mauka, ko Waitaki te awa, ko Ngai Tahu te iwi.

2. My name is Rosemary Clucas.

3. I have a PhD from Otago University (Statistics Department)[1], worked as a freshwater ranger for the Department of Conservation over seven years and have been a self-employed ecologist for the last three years.

4. Much of the work and study I have undertaken has been with reference to mahinga kai species and in a cultural framework. As a person of Ngai Tahu descent, I view our native species and their conservation status through an iwi lens.

5. In preparing this evidence I have reviewed:

    a. The reports and statements of evidence of other experts giving evidence relevant to my area of expertise, including:

        i. Criffel Water Limited – Resource Consent Application

        ii. Luggate Irrigation Company Limited and Lake McKay Station Limited – Resource Consent Application

        iii. Otago Regional Council S42a Report and Response to Questions

        iv. Evidence of Matthew Hickey

        v. Evidence of Richard Allibone

        vi. Evidence of Ian Jowett

    b. Resource Management Act 1991

    c. National Policy Statement for Freshwater Management 2014

    d. Ngāi Tahu Report 1991

    e. Treaty of Waitangi (Fisheries Claims) Settlement 1992

[1] *Kia Whakamaramatia Mahi Titi : Predictive measures for understanding harvest impacts on Sooty Shearwaters (Puffinus griseus)*

f. Fisheries (South Island Customary Fisheries) Regulations 1999

g. Ngāi Tahu Freshwater Policy Statement 1999

h. Kāi Tahu ki Otago Natural Resources Management Plan 2005

6. I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

## EXECUTIVE SUMMARY

7. In my evidence I will cover:

- The story of tuna in the Mata-au
- Opportunities to restore and enhance tuna working with Contact Energy;
- Suitability of the Luggate Creek catchment for reintroduction of tuna.

## MATA-AU AND TUNA

8. I am aware that tuna in the Upper Clutha provided a staple source of mahika kai for many generations, supporting Waitaha, Kāti Mamoe and Kāi Tahu tūpuna using well travelled ara tawhito (ancient trails), nohoaka (resting places), kāika and pā. I refer to the evidence of Dr Michael Stevens regarding cultural associations in the area and mahika kai.

9. I also note that records from the Ngāi Tahu claim hearings record tuna as among the most cherished of tribal resources and most frequently recorded in the mahika kai lists created by Kāi Tahu kaumatua between 1879 and 1880[2]. The 1991 Waitangi Tribunal report describes the importance of having certainty around access to kai

[2] Ngāi Tahu Report 1991, Waitangi Tribunal, Section 3.2.13 and 3.3.11

when journeying inland: "*Preserved food, such as dried fish, could sustain travellers in a hurry, but families travelled at a slower pace, stopping for different periods of time at places where eels were plentiful, weka easily caught, or some other food obtainable*."[3]

10. Longfin eel (*Anguilla dieffenbachia*) are endemic to New Zealand, larger than the shortfin eel (*Anguilla australis*), and widely distributed inland, whereas shortfins are found at lower elevations and in other parts of the Pacific. It was longfins that were therefore relied upon by tūpuna on the inland pounamu trails.

11. Besides their significance as a mahika kai and taoka species, longfins play an important ecological role as apex predators and scavengers[4]. As described in simple terms by the Parliamentary Commissioner for the Environment (PCE) in 2013:

> *"Mature eels are this country's top native freshwater predator. Young eels hunt smaller species such as insect larvae and freshwater snails. As the eels grow larger they hunt larger prey – fish, freshwater crayfish (kōura) and even small birds. Known as an 'apex predator', eels help maintain the health of the freshwater ecosystem by controlling numbers of other species further down the food chain."*[5]

12. Inland commercial eeling operations, as in the Mata-au/Clutha River system, sourced longfins. Commercial eeling of longfins is managed within the Quota Management System (QMS) under the Fisheries Act, a fifth portion of which is set aside for customary non-commercial harvest as a result of the Treaty of Waitangi Fisheries Settlement 1992. Ngāi Tahu tangata tiaki manage the customary fishery in

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[3] *Ibid*, Section 3.2.7

[4] *The status of longfin eels in New Zealand - an overview of stocks and harvest – prepared for the Parliamentary Commissioner for the Environment*, Jellyman, D, 2012

[5] *On a Pathway to Extinction? – An investigation into the status and management of longfin eel*, Parliamentary Commissioner for the Environment, 2013

accordance with the Fisheries (South Island Customary Fishing) Regulations 1999[6].

13. Tuna were deliberately excluded from the upper Mata-au at the time the Roxburgh Dam was built[7], preventing upward migration of elvers and outward migration of females. Estimates are that populations affected by hydroelectric dams have been reduced to a tenth of their original size. I believe that this population impact at the head of the aquatic food chain has consequently affected ecological balance in the river system, allowing species that would normally be consumed by tuna to expand their populations. I note that evidence for the applicants discusses the current dominance of trout in the Luggate Creek catchment, while the evidence of Richard Allibone also outlines the effects of a growing kōaro population in the upper lakes system.

14. For the first couple of decades after establishment of the hydroelectricity scheme, commercial eeling occurred at a significant annual tonnage, fishing out resident eels, but the population has been unable to recover in the intervening years due to fishing pressure and restricted recruitment. Six years of data from the late 1990s – early 2000s showed low average recruitment rates for longfin at the Roxburgh Dam, which is now monitored annually monitored for elver transfers[8]. Reporting to the Parliamentary Commissioner for the Environment in 2012, NIWA identified commercial eeling as a greater impact on longfins than mortality for outward migrating tuna caught in hydrogeneration turbines[9]. A subsequent Ministry for Primary Industries review resulted in introduction of a separate longfin Total Allowable Catch (TAC) in 2016.

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[6] *Review of Management Controls for the South Island Longfin and Shortfin Eel Fisheries (LFE 11-16 & SFE 11-16) in 2016*, Ministry for Primary Industries, 2016, managed as LFE15 with an annual Total Allowable Catch (TAC) that reflects the long term average of catch across Otago and Southland

[7] *The status of longfin eels in New Zealand,* 2012

[8] *We're Making Life Better*, Contact Energy Annual Report, 2019

[9] *The status of longfin eels in New Zealand*, 2012

15. The South Island Eel Industry Association, representing commercial eelers, records the success of juvenile eel transfers into Lake Hawea in 1998, with an estimated 80% survival rate, whilst highlighting the difficulties of managing outward migration of females past hydro-electric dams[10].

16. Longfins are currently recorded as 'At Risk – Declining' in the Department of Conservation (DOC) threat classification system[11]. A new biodiversity strategy[12] was proposed this year, which notes the following cause of failing biodiversity outcomes:

> *"Biodiversity loss can be viewed as resulting from its full value not being recognised or not being reflected in decisions about land, fresh water and marine resource use. This can be for a range of reasons, such as lack of knowledge or awareness, and the difficulty of individual decision-makers factoring in collective benefits and cumulative impacts of small actions into decisions."*

The Minister of Conservation is also currently progressing the Conservation (Indigenous Freshwater Fish) Amendment Bill, in order to strengthen active management of indigenous fish populations, including longfin. I have been involved in responding to this Bill on behalf of Papatipu Rūnanga in Otago and Te Rūnanga o Ngāi Tahu.

## CONTACT ENERGY AND KĀI TAHU

17. NIWA record five methods that can be used to assist outward migration of adult tuna past hydroelectricity dams, including: targeted active spilling to bypass turbines; installation of fish friendly turbines; physical and behavioural deterrents such as nets, screens, noises and bubble curtains; bypasses such as Wairere Falls Power Station; and

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[10] *South Island Eel Industry Association – Eel Fishery Plan for the South Island*, 2009

[11] *New Zealand's Sixth National Report to the United Nations Convention on Biological Diversity*, 2019

[12] *Te Koiroa o Te Koiora – our shared vision for living with nature*, Department of Conservation discussion document, 2019

trap and transfer programmes such as the one operating in the Waitaki River system[13].

18. Contact Energy work with Kāi Tahu, DOC and the commercial eelers to manage a trap and transfer programme past the Roxburgh Dam. A new trap was installed in 2017, which this year transferred over 80 kgs of elvers upstream. These are released at four targeted sites, which have been selected in discussion with Kāi Tahu. Outward migration remains a challenge, and this season the company records a total of 37 migrants translocated from above the dam to below the dam.

19. Outward migration occurs in an annual window between February and June. Fyke nets, hinaki and spotlighting at night work well as alternatives to electric fishing. Migrating females are recognisable by physical changes, including silvering of their bellies, darkening of their fins and darker contrast on their backs, larger eyes and changes in the shape of the head.

20. Kāi Tahu and Contact Energy have recently strengthened cooperation through establishment of the Mata-au Trust, which is bringing to fruition commitments made almost two decades ago when the company renewed its permits for the Clutha power scheme. A key focus of this relationship is to agree a tuna management plan in the catchment, with necessary research and beneficial actions resourced through the Trust. I anticipate this will include opportunities to reintroduce tuna to further parts of the Mata-au system.

## LUGGATE CREEK

21. Clear flowing streams with shaded stony beds, roots, overhanging branches and holes in the riverbank are the favoured habitat of longfins. Inland and upland locations, such as Luggate Creek, are more likely to provide these characteristics as a consequence of degradation of lowland waterbodies. There is anecdotal evidence of

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13 https://www.niwa.co.nz/te-k%C5%ABwaha/tuna-information-resource/solutions-and-management/solutions-downstream-passage-for-adult-migrants

eel presence in the catchment, but no survey data to confirm what the property owners state has been observed.

22. While on site in the catchment earlier this year, my observation was that habitat in Luggate Creek would be well suited to introduction of tuna, providing for the habitat preferences of larger eels and elvers. I note that the applicants and their consultants are supportive of the introduction of tuna in the catchment.

23. I also support the proposal to survey the Luggate Creek for non-migratory galaxiids, particularly above the weir on the north branch and elsewhere in the catchment where survey effort has been limited. This will help to plan for management of tuna in the catchment and understand what is happening with resident fish populations ahead of introducing fish. It will be necessary to properly prepare in this way and have a plan for introduction and monitoring over time. A successful project of this nature will need to be a collaborative one with those managing the catchment, working in with the interests of Papatipu Rūnanga, the Department of Conservation, landowners and water users, and Contact Energy. The good working relationships that already exist will help this process.

24. Kāi Tahu relationship with Contact Energy enables the addition of sites to the current programme of elver releases. Elvers are vulnerable to predation by other species present in the system. A further opportunity exists to target the transfer of feeder eels of between 1 – 2 kg as a biological agent to restore ecological balance and re-establish apex predators. The Luggate Creek catchment provides an ideal location to pilot this approach, which has the potential to restore the role of tuna in the food chain where their presence has diminished. Given the size of the creek at its confluence with the Mata-au, it is also a good site to manage outward migration.

25. Historically considered an ‘enemy of trout’, with tuna culling by anglers encouraged in the first half of the 20$^{th}$ century, times have changed. A 1968 study by Burnet in the Waimakariri is cited as reason for changing attitudes towards culling of tuna in the second half of last century. Half a century along again and Fish and Game Otago are supportive of the introduction of feeder eels in Luggate Creek,

recognising the potential to restore ecological balance in the catchment, which is currently trout dominated.

26. The applicant has shared information that has come from Ian Jowett based on a habitat suitability curve for tuna in the Luggate Creek, concluding that 180L/s (the current minimum flow) will provide an estimated 80-85 percent of tuna habitat (depending on size). I understand that the applicants now propose to maintain between 100-120L/s downstream of the weir on the north branch before the confluence with the south branch, which represents a further reduced habitat, but an improvement on the original proposal. There seems to be some inconsistencies regarding the hydrology of the creek, but if the branches have stable flow with infrequent low flow periods, this would provide a basis to begin planning for the reintroduction of tuna. Flows in the range of 300-350L/s are indicated by the applicants' information to provide an estimated 95% of tuna habitat, which corresponds with the minimum flow that Papatipu Rūnanga are seeking. Minimum flows at this level would provide confidence about long term habitat for any introduced fish, as well as supporting overall ecosystem resilience, although it would still likely be less than the natural low flows.

27. In order for the introduction of tuna into the catchment to have the best chance of success, abstraction would need to be managed by a flow and allocation regime that is set with their habitat needs in mind. The applicants' combined proposal, with current minimum flow, and preserving the natural ratio as preferred by Papatipu Rūnanga will improve security of habitat and provide a better foundation. Progressing to a 300L/s minimum flow would be the best option, whilst still preserving the natural ratio of the branches of the creek.

28. Ideally, a new flow and allocation regime would be set through regional planning changes that recognises the value of restoring tuna populations in the Upper Clutha where they have been in the past.

## CONCLUSION

29. The Luggate Creek catchment has strong potential to support the reintroduction of tuna and contribute to outcomes of a tuna management plan for the Mata-au. Decision on these applications can

provide a foundation for that to occur by supporting the flow preferences expressed by Kā Rūnaka, which are also understood to have the endorsement of DOC and Fish and Game Otago.

**DATED** this 15th day of October 2019

Rosemary Clucas

Ika Logical Limited on behalf of Kā Rūnaka