

**BEFORE INDEPENDENT HEARING COMMISSIONERS
AT NAPIER & WAIPAWA**

**I MUA NGĀ KAIKŌMIHANA WHAKAWĀ MOTUHAKE
KI AHURIRI & WAIPAWA**

IN THE MATTER

of the Resource Management Act 1991

AND

IN THE MATTER

**of the hearing of submissions on applications for
the take and use of water from the Ruataniwha
Basin.**

**WRITTEN REPLY OF DR VAUGHAN KEESING
ON BEHALF OF THE TRANCHE 2 APPLICANTS**

1 DECEMBER 2022

RICHMOND
CHAMBERS

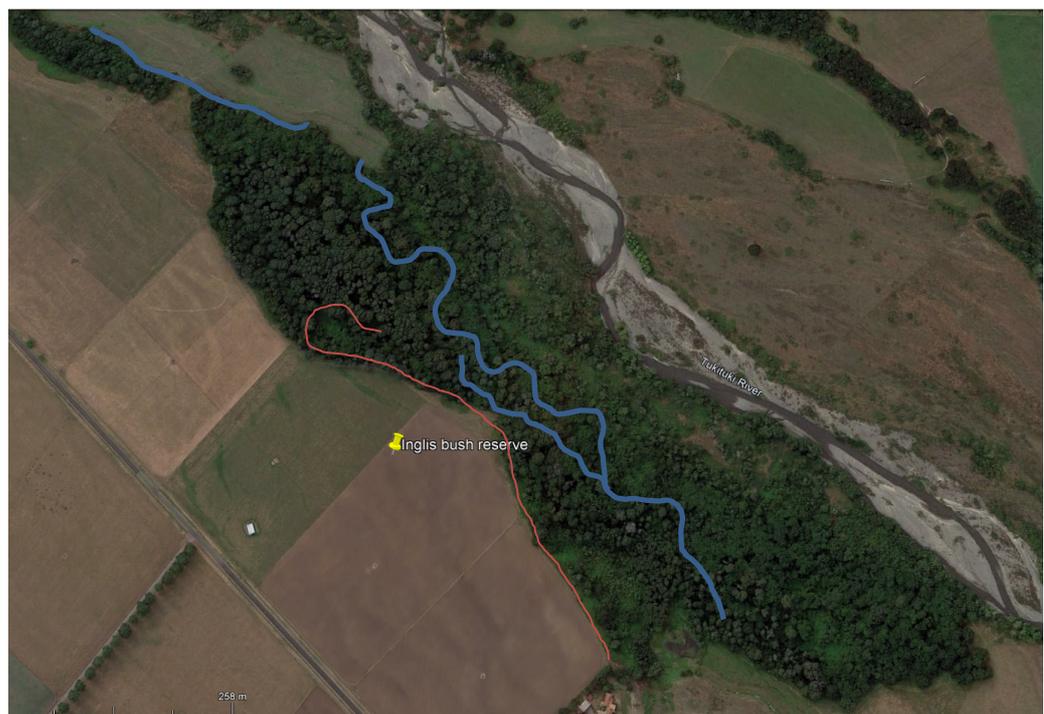
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1. INTRODUCTION

1.1 While I was not present for the submissions presented in regard to Inglis bush (Mr Clinton Deckard) and PDP (Ms Laura Drummond) for Council (Thursday 17th November 2020) I have been made aware of those submissions and have been asked to address briefly in reply the salient aspects related to ecology.

2. INGLIS BUSH, DYING KAHIKATEA

2.1 There was, I understand, some confusion as to the extent of my forest survey with the implication being that the indicative line I drew in my evidence was the full extent of my investigation of Inglis bush. In the below Google aerial the blue line represents the path Mr Van Der Burg and I took, but this included numerous side trips to examine the under canopy and particular trees. The red line is the path Mr Clint Deckard and I took to observe the area of dead / dying kahikatea. The willow weed land towards the Tukituki River is not part of the Inglis bush, but I did venture into it a small way (not shown here). Apart from the western-most corner I have been in and inspected the greater part of the forest.



2.2 The area of clearly dead kahikatea is around 4ha; the area of Inglis Bush (the main area) is around 15 ha and there remains a substantial portion of heathy kahikatea. However, and as discussed with Mr Deckard on site, the under canopy and seedling tier is dominated by tawa and titoki with very (little perhaps no) kahikatea regeneration. Clearly the forest is shifting in its future canopy type. This type of succession is natural where environmental parameters change, and while it may be related to a change in flows from shallow groundwater seeps (I saw no springs), it is also likely that there are a number of other factors involved (including age, browse stress, disease, insect attack, spray drift, etc). In regard to the risk posed by the proposed Tranche 2 applications, Mr Weir and Ms Johansen assure me that the terrace's shallow groundwater which discharges to the forest is not directly connected to the deeper aquifer.

2.3 I understand Mr Deckard accepted that the dam had created the pond, but that my evidence also considered the wetland up-slope of the open water (the willow wetland) is also a consequence of that damming (and historically the race). That is, without the dam the "willow wetland" would not be present. While the feature has faunal value, those values will be retained if shallow groundwater lowering occurs because of the ponded dam water the wetland feature will not be measurably affected.

3. EFFECTS ON SMALLER STREAMS, RIVERS AND WETLANDS

3.1 The Council's reply responds to these matters at paras 3.5 to 3.8. I respond as follows.

3.2 Council experts reflected that there are a large number of surface waterways that will experience depletion but receive no augmentation. What the Council experts did not also acknowledge is that most of those streams that will experience a depletion in late summer already run surface dry for substantive parts of the year. Therefore, any additional depletion, rather than being a tipping point determination, is a low scale increase in the duration of the dry stream bed which already occurs. Because the aquatic flora and fauna is simple due to historic and current modifications

and is adapted to that intermittent flow state, it is already adapted to the additional drying and will not be further adversely affected.

- 3.3 In the joint witness discussion Ms Drummond and I agreed that care had to be taken with where augmentation water was to be discharged, given it is not constantly discharged to cause a perennial flow, so as not to change current intermittent patterns and adversely affect the faunas seasonal patterns. Thus, it would be inappropriate to augment every small stream.
- 3.4 The Council's expert repeated her unease with the limited extent of the surveys, which I take to mean the absence of specific fish and macroinvertebrate studies in all the small streams. With 26 streams to survey in numerous locations with replication, the effort would be greater than the Council undertakes for its State of the Environment reporting. If in my surveys I had seen streams of potential quality, I would have required further survey work. I maintain that the existing fish and macroinvertebrate HBRC data for two of the best northern streams, with my stream physical habitat assessment of the rest and my 25 years of stream survey knowledge across New Zealand, is more than sufficient to understand the probable quality and most likely assemblages present. Ms Drummond in the Joint witness statement agreed with my assessment of the probable simple poor quality assemblages present.
- 3.5 She also repeated her concern over lowering or loss of refugia pools, loss of connection and drying of reaches; but these are all current effects and the proposed takes exacerbate only to a small degree that which occurs in most systems every year in the small streams.
- 3.6 The submission by Ngati Kahungunu Iwi also told of the reducing ground water over time and a correlated decline in surface water stream conditions / health (although a range of factors are responsible for that decline); and of a necessity to rescue tuna in drying stream beds more recently, offering Kahahakuri as an example. Their submission was critical of the fact that it is likely but unprovable, that a small increase in duration and level of water during irrigation season would have no measurable additional adverse effect to instream life. There is anecdotal evidence

(noted by the submitters themselves) that this drying of beds especially in the smaller streams around and west of SH50 has been occurring for many years, and it is likely that tuna have been left dry (those that did not migrate) more regularly than the one incident reported in the submission. This does not mean that the use of the Tranche 2 water will make that condition worse and it does not mean that the current adaptations of the remaining life will not sustain them in this small change. That is the essence of my assessment - that the aquatic and stygofauna of the low surface flow / drying regime in existence today with other land use related effects in the majority of small streams, will not change (it will not get better, but it will not get worse either), hence a largely absent level of adverse effect related to the tranche 2 water tacks.

- 3.7 Lastly Ms Drummond also has reservations that the water level monitoring in small streams can confirm the reliability of the groundwater modelling. I find this curious since it was her suggestion in the joint witness discussion to include such monitoring, and I am of the opinion that it is one of the only ways that an effect might be monitored. Where depth change does not occur, then there will not be an effect. Where depth change does occur and is more than that predicted by the model, then there may be a level of adverse effect that will be identified at an early stage, and if the effects warrant it, then HBRC can, under the conditions, require a further assessment and then make a decision as to whether any formal review of the consent conditions should occur.
- 3.8 I now make comment on fish salvage. A number of submitters have remarked on seasonal dry stream isolated pool eel entrapments. This likely occurs annually, but several more prominent occasions were reflected on in submissions, one of 80 (or so) eel in the Kakahakuri system and another in the Mangamate. The submitters reflected on the need in such occasions for tuna (eel) salvage. As I stated in the questions to the Chair, as the dry season approaches in these small streams of the western basin and the fish species begin to register flow and depth changes, some (eel) will begin seasonal migration movements to perennial sections or larger pool refugia, and some will not. Those that do not can become entrapped in small pools

that persist longer than the riffles and runs. Here they may die or survive until it rains. This occurs now in most of these streams but generally at small scale and often not recorded. The proposal does not introduce this effect, nor to any meaningful extent change the frequency or severity of the effect. However, the applicants have volunteered an annual dry-period fish salvage process to formalise and ensure every year a check and salvage does occur in the drying reaches of the small streams west and about SH50. The establishment of such a process would be a benefit to eel in the basin and does not currently happen other than on an *ad hoc* basis.

- 3.9 Lastly, I understand that there was a number of submitter comments around the level of effect, or that the potential instream and wetland effects have been “understated”. This I see could be considered the case where it has not been accepted that the small streams and wetlands potentially affected are of such modified condition as to be so simple and tolerant and experienced with already substantive drying. However, hearing the verbal evidence, it was clear to me that while submitters still greatly value the awa and they certainly recognise that it has diminished in quality and life supporting capacity, there seems to be a reluctance to accept that once the condition is so “poor”, simple and robust, it will be very hard to further diminish the populations and values that are still present. The proposed small changes to the level of surface water in the small streams predicted does not do that.



Dr Vaughan Keesing

1.12.2022