

BEFORE THE NORTHLAND REGIONAL COUNCIL

under: the Resource Management Act 1991

in the matter of: Resource consent applications by the
Motutangi-Waiharara Waters Users Group
for new groundwater takes from the Aupouri
aquifer subzones: Houhora, Motutangi and
Waiharara

**SUMMARY STATEMENT OF EVIDENCE OF TIMOTHY MICHAEL
BAKER FOR THE DIRECTOR-GENERAL OF CONSERVATION**

27 March 2018

Department of Conservation
Te Papa Atawhai
P O Box 10 420
WELLINGTON
Solicitor: May Downing
Telephone: 027 564 1428
Email: mdowning@doc.govt.nz

Introduction

- 1 This summary of evidence covers the key matters presented in my primary statement of evidence dated 26 March 2018.
- 2 My evidence was prepared at the request of the Department of Conservation (DOC) primarily in response to concerns around the level of effects that this application may have on the Kaimaumau wetland complex.
- 3 Broadly, my evidence focusses on the uncertainty around the degree to which the wetland is connected to the shallow groundwater system and the lack of baseline data with which to characterise and quantify the hydrology of the wetland.
- 4 The groundwater model developed by WWA is a regional scale model that represents the entire Aupouri aquifer. I have concerns about the ability of this regional scale model to accurately predict local scale effects on the wetland. Ms Myers will describe in her evidence the effects of small changes in water level on wetland function.
- 5 The applicant's conclusion that the level of effect on the wetland is less than minor is largely based on the assumption that the wetland is not hydraulically connected to the underlying shallow aquifer because of the presence of an iron pan.
- 6 Evidence of the extent and lateral continuity of the iron pan beneath the wetland is limited, and has been acknowledged as such in numerous reports including by Mr Williamson in his evidence.
- 7 There is also evidence of upward hydraulic gradients in groundwater at the coastal margins. In particular, at bores LOC.4392005 and LOC.4392003 in Kaimaumau and bore LOC.4381001 at Houhora Waterfront (NRC, 22 March 2018). These upward hydraulic gradients indicate the potential for upwelling along the coastal margin of the wetland.
- 8 Radon analyses presented in the Groundwater Modelling Report (WWA, 2017) are interpreted as indicating there is little to no groundwater connection in the surface drains sampled. On the contrary, my interpretation is that that five of eight samples show groundwater contribution ($R_n > 0.5 \text{ BqL}^{-1}$ - Becquerel per Litre).
- 9 Overall, in my opinion there is significant uncertainty in the degree of connectivity between the wetland and shallow groundwater. Upwelling of groundwater in low lying coastal wetlands is not unusual, and therefore I recommend further baseline data collection is carried out in order to understand the connectivity further.
- 10 My evidence also discusses the limited hydrological and hydrogeological data available for the wetland. There is little to no quantification of inflow and outflows into the wetland (i.e. a water

balance) and no monitoring of groundwater water levels adjacent to or in the wetland. The closes location is the newly installed LOC.4392005 and LOC.4392003 in Kaimaumu. A baseline dataset is important both to provide a robust conceptualisation of the wetland system, and to provide a reference against which to monitor for potential changes.

- 11 In my opinion, given the uncertainties in the connection, and without a baseline dataset for the wetland, the abstractions should not proceed until such time as these datagaps and questions are addressed.
- 12 My evidence also notes that calibration of the model is based on groundwater level records (heads) that are solely in the northern half of the model domain. A more evenly distributed series of calibration points would be preferable, in particular some around the southern part of the model where there are a number of proposed takes in close proximity to the wetland.
- 13 Finally, my evidence also discussed the uncertainty related to the use of uncalibrated drain flow data as the main mechanism to quantify the level of effect of the wetland. It is my understanding that the model was calibrated to groundwater heads only, and not fluxes. As such, the percentage reductions in drain flows estimated as a result of the abstraction should be treated as indicative estimates, rather than absolute values.
- 14 I note that NRC have in the last few weeks undertaken further work to characterise the saline interface around Kaimaumu. This is presented in evidence lodged on 22 March by NRC. This is useful information, however it highlights there is much work to do before the hydrogeology of this area is fully understood and I urge caution in proceeding until such time as adequate investigations have taken place.
- 15 The proposed Groundwater Monitoring and Contingency Plan proposes new monitoring wells at Motutangi and Norton Road, plus the monitoring of a shallow bore at Honeytree Farms. These locations are good, but would need to be supplemented by further location in order to adequately assess the baseline conditions and monitor the effects on the wetland.
- 16 In summary, the lack of robust baseline data for the wetland makes setting trigger levels and developing an adaptive management regime difficult. My recommendation is that the application in its current form is declined until such time as a baseline data set is collected, and greater certainty around the connectivity of the wetland to shallow groundwater is gained.