

BEFORE THE

Proposed District Plan Hearings Panel of Thames
Coromandel District Council **UNDER** the Resource
Management Act 1991

AND

IN THE MATTER

of the Proposed Thames Coromandel District Plan

**EVIDENCE OF DR PHILLIP J. BISHOP ON BEHALF OF COROMANDEL WATCHDOG OF
HAURAKI INC**

INTRODUCTION

1. My name is Phillip J. Bishop, I am a Professor of Zoology at the University of Otago.
2. I give this evidence in my expertise as an amphibian biologist (a specialty area within the field of Zoology). I have studied amphibian biology, ecology and conservation for 34 years, written over 60 academic papers, studied New Zealand's native frogs (all four species) for the last 14 years. In recognition of my expertise in this area I have been appointed to two top international positions responsible for coordinating the global response to declining amphibian populations across the world (IUCN SSC Amphibian Specialist Group Co-Chair and the Chief Scientist of the Amphibian Survival Alliance – for further information please see amphibians.org)
3. I have read the *Code of Conduct for Expert Witnesses in the Environment Court Practice Note* and agree to comply with the Code. The evidence is within my area of expertise, except in relying on the evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.
4. In forming this opinion, I have relied on my own personal knowledge of the species and past literature, but specifically I have recently consulted the following documents:
 - a. Fouquet et al. (2010) Phylogeography of *Leiopelma hochstetteri* reveals strong genetic structure and suggests new conservation priorities. *Conserv. Genet.* 11: 907 – 919.
 - b. Fouquet et al. (2010) Using ecological niche modelling to infer past, present and future environmental suitability for *Leiopelma hochstetteri*, an endangered New Zealand native frog. *Biological Conservation* 143: 1375 – 1384.
 - c. Bell and Wassersug (2003) Anatomical Features of *Leiopelma* Embryos and Larvae: Implications for Anuran Evolution. *Journal of Morphology* 256: 160 – 170.
 - d. Bell et al. (2004) The recent decline of a New Zealand endemic: how and why did populations of Archey's frog *Leiopelma archeyi* crash over 1996–2001? *Biological Conservation* 120: 189 – 199.
 - e. Cree (1989) Relationship Between Environmental Conditions and Nocturnal Activity of the Terrestrial Frog, *Leiopelma archeyi*. *Journal of Herpetology* 23: 61 – 68.
 - f. Adlassnig, et al (2013) Amphibians in metal-contaminated habitats. *SALAMANDRA* 49(3): 149 – 158.
 - g. Roelants, et al. (2007) Global patterns of diversification in the history of modern amphibians. *Proceedings of the National Academy of Sciences* 104: 887-892.
 - h. EDGE Amphibians 1. Archey's frog (*Leiopelma archeyi*). http://www.edgeofexistence.org/amphibians/species_info.php?id=546.
 - i. Bishop, et al. (2014) Native frog (*Leiopelma* spp.) recovery plan, 2013–2018. Threatened Species Recovery Plan. Publishing Team, Department of Conservation, PO Box 10420, The Terrace, Wellington 6143, New Zealand. ISSN 1178–0169 (web PDF).
 - j. Bishop, et al. (2008) Leiopelmatid frogs: the world's most archaic frogs. In: S. N. Stuart, M. Hoffmann, J.S. Chanson, N.A. Cox, R.J. Berridge, P. Ramani, B.E. Young, (Editors), *Threatened Amphibians of the World*. Lynx Edicions. Pp. 71-72.

- k. Bishop, et al. (2012) The Amphibian Extinction Crisis – what will it take to put the action into the Amphibian Conservation Action Plan? *S.A.P.I.EN.S* [Online], 5.2 | 2012, Online since 12 August 2012, Connection on 11 October 2012. URL : <http://sapiens.revues.org/1406>.
- l. Coromandel Watchdog of Hauraki's Submission
- m. Proposed District Plan for Thames Coromandel chapter 14 and 37

Native Frogs in the Coromandel

5. The Coromandel Peninsula contains the stronghold population of Archey's frogs and several unique populations of Hochstetter's frog. Archey's frogs were widespread throughout the Coromandel Range (usually above 100m) and have been extensively studied at Tapu Ridge, Tokatea Ridge and Te Moehau. Small frog populations are frequently discovered when other suitable sites are surveyed (e.g. Wharekirauponga in 2012). As we do not fully understand the extent of occurrence, or the importance or interconnectedness of these fragmented populations, it is appropriate to take a precautionary approach.
6. Archey's frogs and Hochstetter's frogs are the most ancient lineage of all frogs and were hopping around the feet of the dinosaurs. They are both threatened and Archey's frog can be considered to be on the brink of extinction.
7. Archey's frog is listed by the Zoological Society of London as the world's No. 1 most evolutionarily distinct and globally endangered amphibian out of the total of over 7000 amphibian species (Hochstetter's frog is no. 39). New Zealand has a moral obligation to do everything it can to ensure the survival of these incredible amphibians.
8. Frogs are widely accepted as the "barometers" of environmental decline because their unique lifestyle makes them incredibly sensitive indicators of changes to the environment.
9. Habitat change (destruction and fragmentation) is the major cause of disappearing and declining amphibian populations throughout the world and New Zealand is no different as our native frogs have a dramatically reduced range. Removal of forests and pollution of streams are obvious direct changes that would be detrimental to the frogs. However, subtle changes in the hydrology and contamination of groundwater caused by surface and underground mining, particularly the environmental watershed sustainability, are likely to have serious consequences on populations of these largely fossorial amphibians. Very little research has been conducted on these indirect effects of mining on amphibian populations.
10. I have been asked to comment on the definition of "effects" in section 3 RMA, which refers to:
 - “(a) Any positive or adverse effect; and
 - (b) Any temporary or permanent effect; and
 - (c) Any past, present, or future effect; and
 - ..(d) Any cumulative effect which arises over time or in combination with other effects – regardless of the scale, intensity, duration, or frequency of the effect, and also includes-
 - (e) Any potential effect of high probability; and
 - (f) Any potential effect of low probability which has a high potential impact.”

11. As stated, very little is known of the extent of occurrence, likely habitats, and importance or interconnectedness of these fragmented populations. Surface and underground mining within the conservation estate, coastal areas, and any non-urban area of the Coromandel, has the potential to have an effect on rare amphibian populations. This constitutes “at least” a potential effect of low probability with a high potential impact.

12. In fact, there is a very high probability of a potentially catastrophic impact to frog populations if their habitat is affected by mining operations. These frogs are already in serious trouble (with predators, disease and ongoing habitat modification) and there is a high likelihood that mining could be ‘the last straw’ which could send them into an extinction vortex.

Dated 18 December 2014

Dr Philip J Bishop